MAR. 7 1958

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

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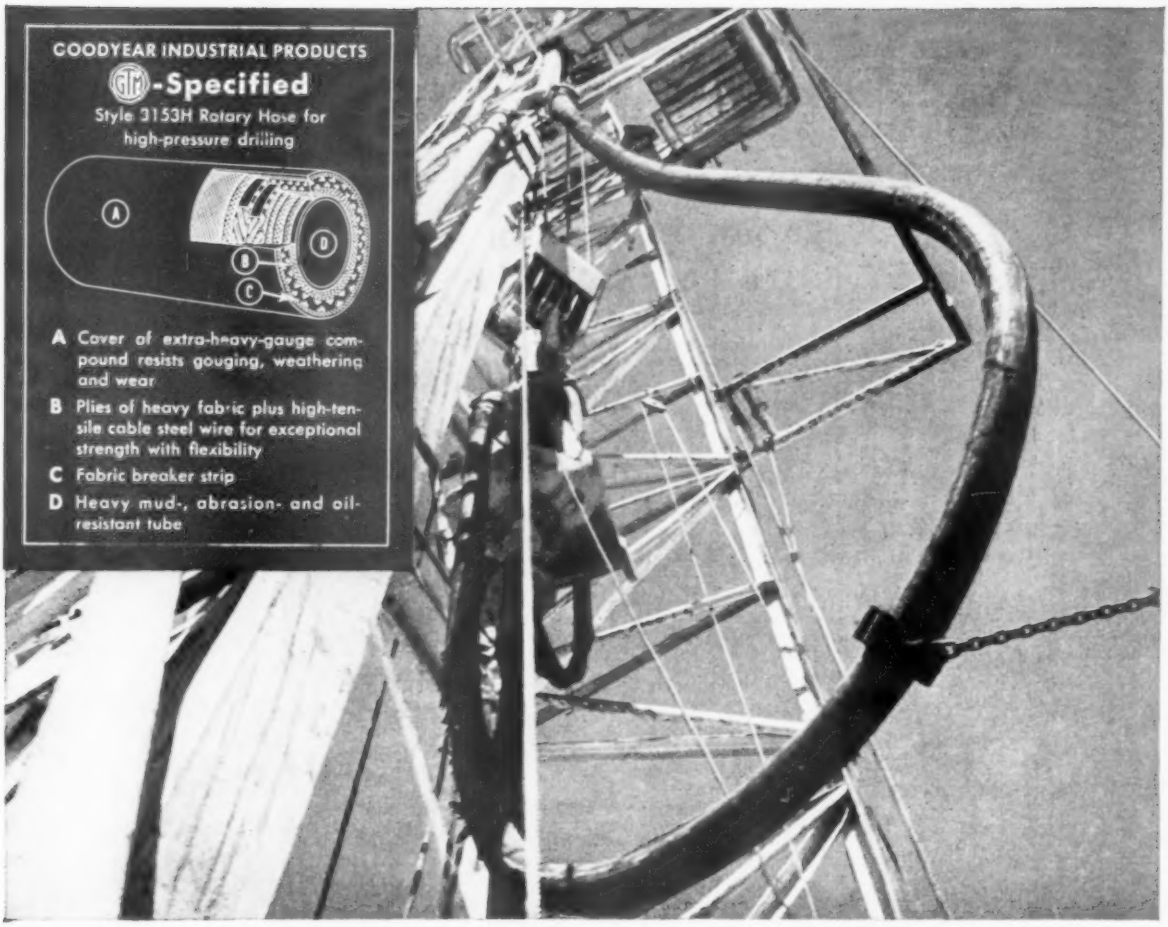
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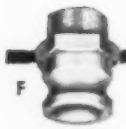

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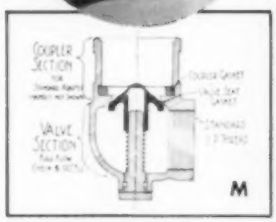
EVER-TITE SHANK HOSE COUPLING



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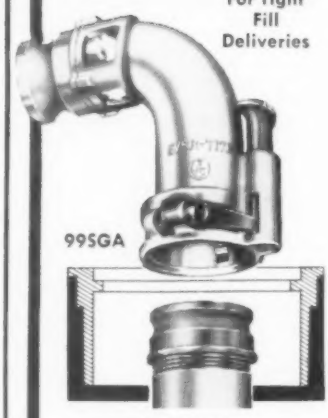

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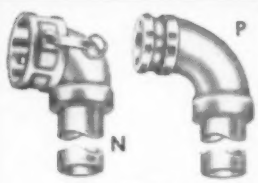

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PETROLEUM WEEK

MARCH 7, 1958
Vol. 6, No. 10

Number of copies of this issue printed: **45,206**

Published weekly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), founder. Publication office: 871 N. Franklin St., Chicago 10, Ill. See panel below for directions regarding subscriptions or change of address.

Executive Editorial, Circulation and Advertising offices: 330 W. 42nd St., New York 36, N. Y. Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice President; L. Keith Goodrich, Vice President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; A. R. Venezian, Vice President and Circulation Coordinator.

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Subscriptions: Address subscription correspondence and change of address to Subscription Manager, Petroleum Week, 330 W. 42nd St., N. Y. 36, N. Y. On address changes, please give old and new address and zone numbers, if any, and enclose an address label from a recent issue if possible. Please allow one month for change to become effective.

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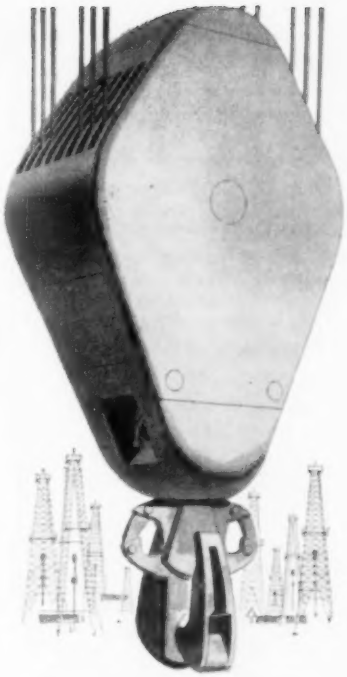

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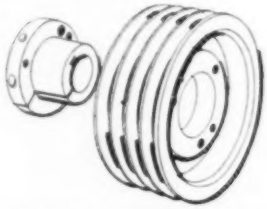
LANDMARKS IN OIL INDUSTRY PROGRESS

Pictured on this page are some of the landmarks in oil industry progress that were developed by Worthington. But Worthington isn't satisfied with historical "firsts." Today in 10 research laboratories the men of Worthington are searching for new equipment ideas that will reduce the cost of getting oil out of the ground, refining it, and delivering it to the ultimate customer.

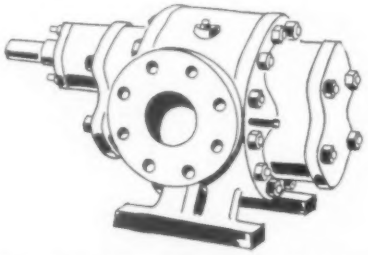
For the latest in "power" products get in touch with the man from Worthington. You'll find Worthington staffs located in 49 U. S. cities as well as in major centers around the world. Call on them for engines, compressors, turbine generators, condensers, pumps, construction equipment or air conditioning and refrigeration equipment. Worthington Corp., Harrison, N. J. 332-3

1938



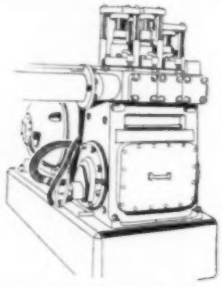
FIRST SHEAVE WITH TAPERED, SPLIT HUB. Sheaves used to be a big problem. If the sheave was tight enough on the shaft to absorb the shock loads, it was usually hard to get off when repairs were necessary. Worthington solved this problem with QD (Quick Detachable) sheave. It's easy to get on, easy to get off, yet grips the shaft tightly. Today, it's the accepted standard of the industry.

1940



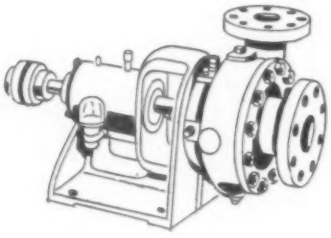
FIRST STANDARD ROTARY PUMP WITH SUCTION AS LARGE AS 16 INCHES. In 1940 Worthington introduced a standard rotary pump in the 16" suction size. A rugged pump, combining long life with low maintenance, it still is the only standard rotary available in the larger sizes.

1949



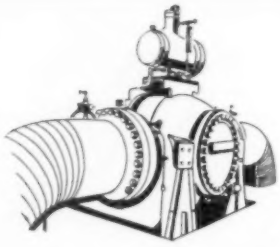
FIRST COMPLETE LINE OF WATERFLOOD PUMPS. Not only is Worthington the world's leading builder of pumps, but Worthington was also the first to offer a complete line of waterflood pumps. With nine types of vertical multiplex plunger pumps Worthington still offers more sizes and types than any other builder.

1950



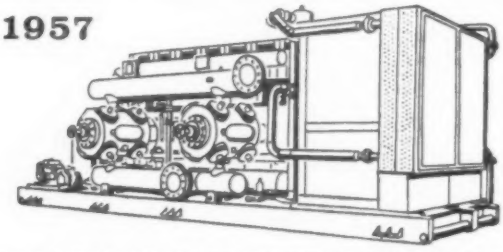
FIRST COMPLETE LINE OF STANDARDIZED CENTRIFUGAL PUMPS. Called SESC—Standard End Suction Centrifugal—this line permits petro-chemical plants to reduce inventory up to 50%, greatly simplify maintenance and reduce downtime. Built from standard, stocked parts, the complete line consists of six separate types, all suitable for either motor, turbine, or belt drive.

1954



FIRST "CENTERLINE" CENTRIFUGAL COMPRESSOR went into service at Northern Natural Gas Company's Macksville, Kansas, station in December, 1954. A brand new idea in compressor design, Worthington's type GUP compressor has a spherical casing supported at the center line. As a result, shaft distortions are minimized, starting stresses reduced and bearing life extended.

1957



FIRST TURBOCHARGED 4-CYCLE ENGINE COMPRESSOR FOR GAS FIELD SERVICE. Designated the SLHC, this new turbocharged engine compressor is more compact, more economical, more reliable than other naturally aspirated units. Its smaller size cuts the cost of fabrication, installation and moving, giving you a better engine per dollar investment. Available in the medium horsepower range.

60-Second Summary / WHAT'S HAPPENING IN OIL

AT-A-GLANCE PETROLEUM WEEK Copyright

March 7, 1958

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The government wants oil men to try an atomic bomb. The idea is that its terrific blast, underground, might be highly useful in secondary recovery. If you don't like bombs, there's a deep-deep drilling project to consider. . . . p. 14

•

The crude price structure is undergoing a change, leading toward postings pegged to refining value of various oils. It's a sharp departure from the gravity-scale method. Highest-gravity oils are getting the largest penalties. . . . p. 12

•

A big question facing producers is what type of imports control plan has the best chance in Congress. Realizing this, most producer groups are ready to support any reasonable proposal—or compromise—in order to get some law passed. . . . p. 11

•

"Gasoline factory" is an apt description for Pontiac Eastern Corp.'s new refinery. It's designed for an 85% gasoline yield from 16-gravity south Mississippi crude. . . . p. 60

•

Three deep tests in West Texas have ignited a new interest in air and gas drilling. It's too early for a complete evaluation, but operators appear satisfied so far. . . . p. 19

•

Oil pipeline capacity continues to grow fast. Since 1950, the biggest expansion has been within the Mid-Continent and Southwest areas. . . . p. 36

•

Venezuela's Paraguana Peninsula is one of the fastest growing refinery centers in the world. By summer, capacity of two plants will be up to 640,000 b/d. . . . p. 34

•

Pure Oil Co. has embarked on a truck-stop station building program in a 24-state area. The 300 planned outlets offer special services to attract high volume. . . . p. 72

•

Radically new exploration techniques will have to be developed if the oil-finding rate is to be increased significantly. Improvements in existing tools and methods will help, but not enough to check the declining discovery rate. . . . p. 47

•

The outlook for product prices is uncertain. Despite a big drop in stocks, fuel buyers are cautious. Gasoline stocks appear ample even with reduced runs. . . . p. 80

•

The Supreme Court is going to keep gas pipeline companies waiting. It has refused to hurry a hearing on the Memphis case. . . . p. 13

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE PETROLEUM WEEK Copyright

March 7, 1958

The Cabinet oil committee wants to reach a decision on imports before a House group acts. Its choice lies between continuing the voluntary program and asking the President to apply mandatory controls. The committee fears that, unless it acts soon, the matter may be taken out of its hands by Congress, where views on oil imports are now being aired.

By government standards, the voluntary imports control program is getting results. Matthew V. Carson, the imports boss, reported this week that crude imports in January were 4,700 b/d below the recommended level. Districts 1-4 were over, but the West Coast was under. Also, importers' plans for the next five months show "substantial" compliance.

Old importers are apt to be asked to make room for new ones. Carson doesn't want to raise the over-all ceiling while domestic production is being cut. The alternative: If new importers are to get "quotas," established importers will have to be asked to cut their imports further.

•

A U.S. nuclear-powered tanker may be afloat by 1961. The government wants to hurry the project by installing a nuclear unit in a tanker already under construction. Studies have been ordered, with reports due in 90 days or so.

•

Iran's ambassador to Washington has been recalled for proposing a "share-oil-wealth" plan. Ali Amini, the ambassador, said recently that if Middle East producing nations would share their profits with "have-not" nations, it would do away with poverty in those areas. This week his government recalled him, saying he shouldn't have expressed his personal views on such a subject without first consulting the foreign ministry.

•

The military must now get congressional approval for land withdrawals, if the area exceeds 5,000 acres. The President has signed a bill making this the law. It also limits Navy oil drilling to specific petroleum reserves.

•

One of the most talked-about wildcats in West Texas has been completed. It is Magnolia's No. 1 Brown-Bassett in Terrell County (page 19), which flowed at an estimated rate of 75-million cu. ft. of gas daily on 12-hour test through 36/64-in. choke and Silurian perforations at 13,387-446 ft.

•

Lone Star Steel is laying off 1,500 men. The firm, which sells mostly to the oil and gas industry, said a "considerable" inventory of steel pipe exists.

•

Lebanon is seeking bids on contract drilling. Its terms include: bids by Apr. 15; start of drilling by Aug. 24; drill 30,000 ft. within a year. If you're interested, call the Lebanese consulate in New York.

keep gum formation out of the picture with....**Tenamene**

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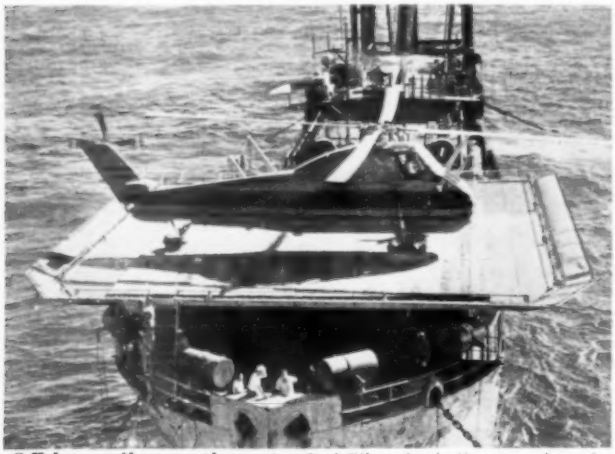
On-the-spot technical service is available from qualified Eastman petroleum specialists to help you achieve maximum performance from these dependable additives.

For more information on Tenamene additives and the service that backs up their proper use, contact our local representative or write to EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

SALES OFFICES: **Eastman Chemical Products, Inc.,** Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston.
West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Sikorsky S-58 pinpoints supplies at a jungle drill site. Earlier the rig itself was airlifted in sections to the site by helicopter. The S-58 will carry two tons of cargo in its Utility version.



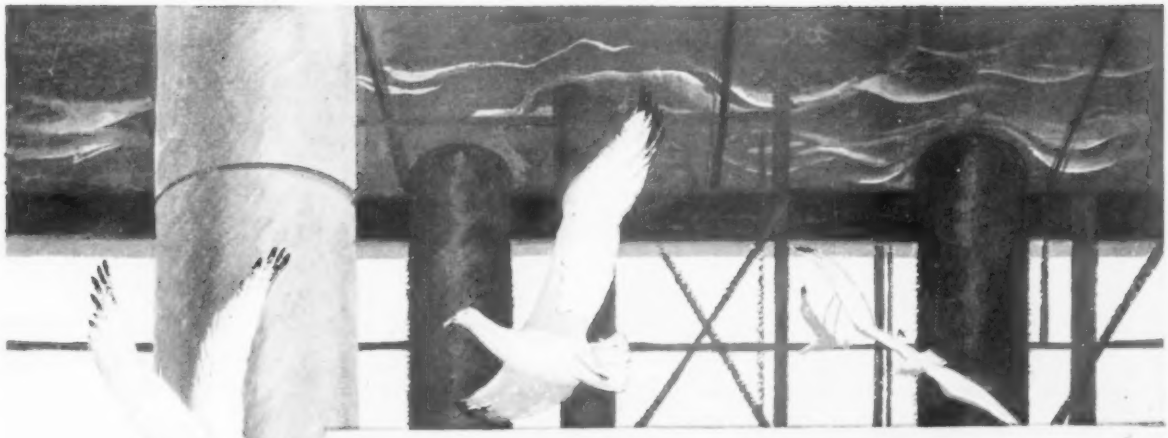
Offshore oil operations also find Sikorsky helicopters best for airlifting quantities of men or cargo. In the Gulf of Mexico area alone, Sikorsky S-58s and S-55s are carrying more than 27,000 passengers monthly to and from rigs.

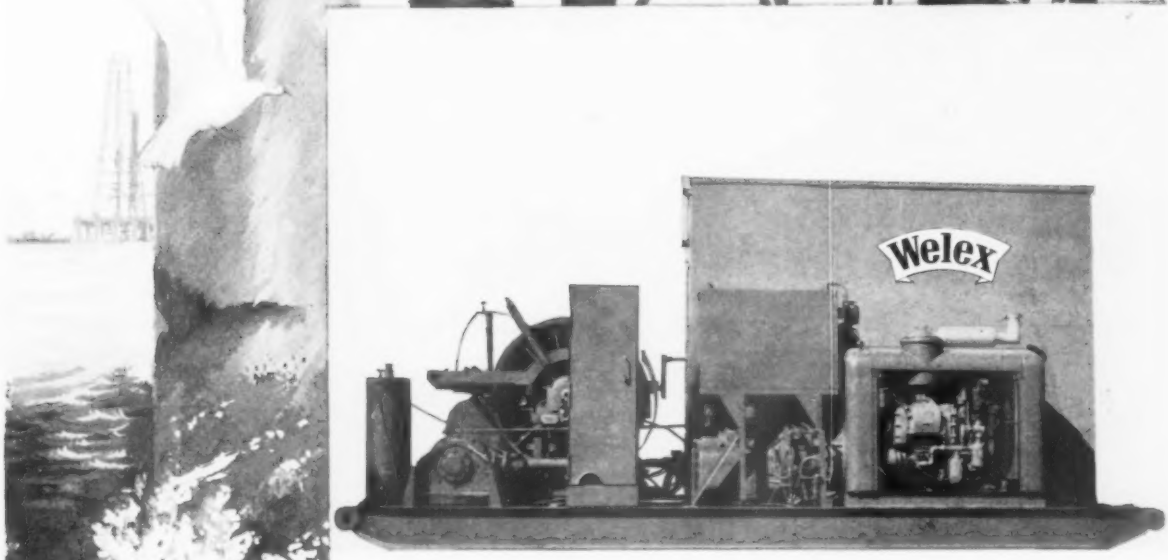
Why build roads?

Eliminating the need for costly road building, big Sikorsky helicopters have pioneered a new technique for oil drilling operations. With loads averaging about two tons, they flew directly from supply bases to drilling sites in the New Guinea jungle. They carried crews, sectionalized oil rigs, and all materials needed for construction and operation. Only a few months were required. An estimated 18 months would have been needed to do the job using ground transportation.

Sikorsky helicopters—and only Sikorskys—have proved their dependability in such actual heavy cargo operations in jungles and other primitive areas. If you have a problem involving moving men or materials to hard-to-reach places, write for information on how well Sikorsky helicopters can do the job.

SIKORSKY AIRCRAFT
STRATFORD, CONNECTICUT
One of the Divisions of United Aircraft Corporation





Welex YELLOW Has Gone to Sea

In the area which had been set aside for sea gulls and ships and sharks, the tremendous offshore drilling platforms have become a recognized partner. Now, the Welex offshore units have added their yellow brilliance to this picture. Here, oil men have tapped resources that are thousands of feet underneath a land that is covered by hundreds of feet of water. To aid these sea-going oil men, Welex offshore units offer the same top flight services that have earned the confidence of operators and producers on land for many years. From these bright yellow offshore units, perforating, resistivity and radioactivity logging and other special wireline services of unexcelled quality are all in a day's work. Only with Welex on the job can operators be assured of having available *every* needed logging and perforating service. On land or offshore, Welex offers the most complete industry-accepted wireline services whenever and wherever they are needed.

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More *proven* advantages are yours with Continental-Emsco Slush Pumps.. get all the facts about big performance.. low weight "D" Series Pumps.

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PETROLEUM WEEK
March 7, 1958

Congress Hears Oil Control Plans

The oil imports issue is being aired in Congress this week as a part of the debate over the Reciprocal Trade Act. Producers, importers, and others affected are presenting their views.

Domestic producers are willing to accept just about any type of congressional action on imports—if such legislation provides a sure means of restricting the flow of crude from abroad.

Various producer groups have been drafting tentative recommendations for legislation for some time now. And the groups have met on several occasions in an effort to outline a single plan which all would support.

The starting point for these discussions was the general agreement among producers that the government's voluntary program would not get the job done.

Nor was there confidence that the Administration itself would swing to stiffer, mandatory controls.

The alternative, then, was to seek congressional action. That brought up the big question of just what to ask Congress to do.

For the most part, producer leaders now feel that it would not be best to stake all their efforts on a single plan.

For one thing, insistence on a single plan might mean no support—or only lukewarm support—from producers and producer groups who favor another plan.

Too, a single plan—particularly one drafted with only oil imports in mind—probably would not generate support from other domestic industries that are also interested in imports controls in their fields.

Finally, a single plan would give oil opponents a clear-cut target for attack.

The one thing the producers are insistent on is that Congress should establish a definite yardstick for imports—and should provide a penalty for violators.

Their biggest complaint against the voluntary control plan is that it has no teeth. If any importer wishes to violate it, there is nothing to stop him except public opinion.

For these reasons, producers appearing in Washington this week were putting their emphasis on the need for SOME type of specific imports controls—but weren't pressing for any one particular plan.

TIPRO and IPAA, for example, have carefully left the door open for consideration of alternate roads.

Each organization has in recent weeks suggested one or more specific approaches. But each has made it clear it is not ruling out other proposals.

The various means of restricting imports center chiefly on a choice of either quotas or tariffs—or of a combination of the two.

A quota system would place a specific limit—either in actual amount or in percentages tied to domestic operations—on oil from abroad.

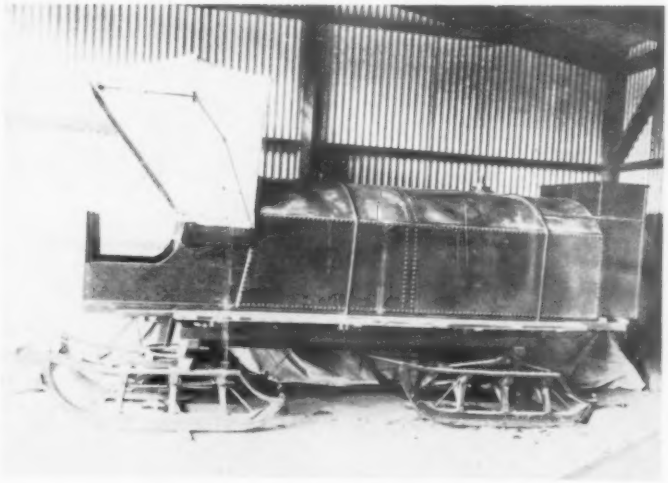
Tariffs, on the other hand, would not set a quantity limit, but would apply economic discouragement. The higher the tariff, the less profitable it would be to import crude.

A combination plan would put higher tariffs into effect above a given level of imports.

One novel proposal—included in those suggested recently—would involve competitive bidding for import rights.

Basically, the plan is a combination tariff-quota to limit imports. It parallels in many ways an earlier plan pro-

Oil Man's Album



Snow Trouble: When Roads Ice Up, Try a Sled

The recent frigid weather reminded a lot of people of the rugged winters back when they were young. During such a winter, this tank wagon was equipped with runners so deliveries could be made. It would have come in handy in many places a couple of weeks ago.

(No. 4 of a Petroleum Week series)

posed by IPAA, although it would apply to products as well as to crude.

It provides that imports in any quarter shall not exceed 16.6% of domestic production for the same quarter of the preceding year. (Currently, that would mean that total imports would be restricted to about 1.2-million b/d.)

The President would set quotas, by countries, on the total that could be imported.

He would base his action on the availability of crude in an emergency. Obviously, this would give such countries as Canada and Venezuela an advantage over Middle East producing nations.

After the quotas were set, importers would bid for the right to import the oil.

The government would pocket the money from the bids made for the rights to import.

Another plan that has been given wide circulation would provide a means for a sharp hike in present tariffs.

This plan would change the present trade act to authorize a negotiated increase of 50% of the ad valorem equivalent of any specific rate of duty. (This would be applicable to any product, not just to oil alone.)

Advocates of the plan point out that, in the case of crude oil, the 21¢-a-bbl. tax in 1934 was the ad valorem equivalent of about 24%. Under the proposed amendment, a tariff of $1.08 a bbl. would be permitted.

The levy could be reduced by the President through negotiations if he found that imports from a given nation were available in a national emergency. (Again, this would benefit Western Hemisphere nations.)

One strong consideration being given all the proposals is this: Which one has the best chance of passage?

Advocates of a tariff, rather than quotas, say that a tariff hike would stand the best chance of getting congressional approval.

They point out that Congress has traditionally favored tariffs over quotas—that it has never passed a quota bill except on agricultural goods on which there are price support programs.

They say the Executive branch too, has traditionally favored tariffs.

Tariffs also would help sustain an adequate price structure in the U.S., they say.

Proponents of a quota plan point out that it would probably have a good chance because it comes nearer matching the current voluntary controls program applied to crude.

Note how recent price adjustments show that . . .

Crude Pricing Is Changing

Crude postings are gradually being changed to the basis of the value of a particular grade of crude to refiners—a departure from the strict gravity price scale used since 1922.

This trend is evident in the current round of adjustments in crude prices.

The trend started in a few scattered areas in 1956, as was first pointed out by PETROLEUM WEEK (PW—Sep.14 '56,p9).

It became more pronounced for some crudes at the time of the last general advance in crude postings, in January, 1957.

Most recently though, the trend has become established in many areas.

Cities Service Oil Co., for example, last month put Scurry County crude on a West Texas intermediate posting schedule, effecting a reduction of 7¢ a bbl. from the "sweet" posting previously in effect. The company's top posting for 40-gravity Scurry oil was cut to $3.08 a bbl.

Gulf Oil Corp., as far back as January, 1957, specifically adjusted its postings for the highest-gravity oils downward, with its postings for segregated Ellenburger crude in West Texas.

Sinclair Crude Oil Co. placed North Texas (District 9) crudes on an intermediate posting, a cut of 7¢ a bbl.

Southern Oklahoma sour crudes and mixed crudes were cut 10¢ a bbl. by most buyers in February.

The adjustments toward the value-to-refiners type of postings are being effected through price penalties, primarily for higher-gravity oils.

Cities Service's action trimming 2¢ a bbl. off intermediate crudes above 44.9-gravity last month is just one example. High-gravity condensates have been sharply reduced in some areas, the cuts ranging from 15¢ a bbl. to as much as 45¢ a bbl.

Atlantic Refining Co. initiated the current move to put Texas Gulf Coast and some Louisiana coastal condensate on a flat posting of $3.20 a bbl.

But as far back as mid-1957, Champlin Oil & Refining Co. cut condensate in some Oklahoma fields as much as $1.03 a bbl.

Refiners generally say that such adjustments are essential if they—as expected—are to be in position to pay increasingly higher prices for the most valuable crudes.

The existing pricing method—the gravity scale—has failed to reflect properly the lower realization to refiners on higher-gravity crudes, due to high gasoline content and relatively low octane numbers.

And because of today's trends in automotive engine design, the variation in octane number of gasoline from various crudes becomes increasingly important in determining their total value.

One big reason why the adjustments in postings are necessary is the definite trend toward producing increasing quantities of high-gravity, high-gasoline-yielding crudes, characterized by low straight-run octanes.

Some refiners contend that there is a definite correlation between deep production, found in increasing volumes today, and high gravity.

And their data show that the higher the gravity, generally, the higher the yield of low-octane gasoline.

The big majority of existing refineries are designed to run primarily a middle-gravity stream, roughly in the 36-gravity range.

But for such a refinery to increase the quality of the gasoline from the higher-gravity oils imposes a capacity limitation because of a reduction in the yield of gas-oil for cat cracker feed from the high gravity crudes and condensate.

One refiner draws a comparison between West Texas Devonian crude of 37-gravity and West Texas Ellenburger of better than 51-gravity, which, based on refinery realization and posted prices, gives the Devonian crude a 36¢-a-bbl. advantage over the Ellenburger.

The Devonian oil has a 34.1% yield of straight-run gasoline with an octane rating of 64.3. The deeper, higher-gravity Ellenburger has a straight-run gasoline yield of 41.2%, but with an octane rating of only 46.7.

But there is another big difference, in addition to the "lost" octane.

The yield of heavy gas-oil for cat cracker feed from the Ellenburger oil amounts to only 13.3%, compared with a 29% yield from the Devonian crude.

The yield of light gas-oil also for cat cracker feed from the Ellenburger oil was only 1.6 percentage points higher than from the Devonian—not nearly enough to offset the loss of heavy gas-oil.

To upgrade the increasing volume of low-octane, straight-run gasoline requires greater use of such tech-

niques as catalytic reforming, alkylation, and, more recently, isomerization. But refiners are quick to argue that their economics are still pegged on making the great bulk of their octane requirements in the cat cracker, the refinery "workhorse."

And while the newer, octane-improving techniques are needed for turning out the highest octane needs, refiners say that the use of such techniques for the bulk of the octane-pool needs is not economically attractive based on the present level of posted prices for the higher-gravity oils.

With the squeeze continuing on product realization, some refiners have begun to think in terms of specific penalties that should be assigned to higher gravities.

Based on the going market prices for various raw materials, one refiner says that:

- If the gravity of a crude stream is raised due to butane content, then the reduction in refinery value is 2½¢ per degree of gravity.
- If the gravity of a crude stream is raised due to 18-lb. natural gasoline content, then the reduction in refinery value is 2¼¢ per degree of gravity.
- If the gravity of a crude stream is raised by 75-octane condensate, the reduction in refinery value is 1¾¢ per degree of gravity.

Sour crudes, for example, already carry price penalties, due to the additional processing costs.

West Texas sour crudes are penalized 13¢ a bbl. off the posted price for West Texas sweet crudes.

While most refiners agree that there is a need to revise the posted-price base, nearly all of them say that a broad change in the price structure can't be made overnight.

In fact, some refiners say, a gravity-scale posting method may always be used on some crudes, but that the differentials between varying gravities may range higher than the historic 2¢ spread per degree.

One of the big complications in pricing crudes on a value-to-refiners basis, is that the real value of a particular crude may vary among refiners—even among those operating in the same area and using similar crudes.

As a matter of fact, the value on a particular crude differs among refineries operated by a single company.

But over the long haul, when the price-posting change is finally accomplished, the better crudes will always be in strong demand, and the poorer-quality crudes will be placed in a price perspective at which there will be a demand for them, too.

Crude Price Cuts Continue

Lower postings hit Pennsylvania-grade crudes last week, with the largest buyers cutting 25¢ a bbl.

The reduction was initiated Mar. 1 by Quaker State Oil Refining Corp. and Pennsylvania Refining Co. It was met by South Penn Oil Co.

New prices are $4.40 a bbl. for Bradford district, $3.93 for Southwest Pennsylvania, $3.75 for Eureka, $4.22 for Middle District, and $3.75 for Buckeye, in southeastern Ohio.

And in Southwest Texas, Republic Oil Refining Co. division of Plymouth Oil Co. effected cuts of from 5¢ to 15¢ a bbl. For some crudes in Arkansas, Jim Wells, Nueces, Refugio, and San Patricio counties.

Republic also cut heavy Plymouth type (segregated) crudes 5¢ a bbl.

Despite reductions in allowables, purchaser proration continues in some states.

Gulf Oil Corp. will take only 85% of the March allowable in Louisiana. In New Mexico, its take will be 80% of its January purchases.

Earlier, Esso Standard Oil Co. said it will only take 75% of the Louisiana allowable in March.

In Mississippi, Esso Standard will only take 80% of its actual February runs during March.

In Oklahoma, Kerr-McGee Oil Industries, Inc., at the end of last week said it was making a second cut of 5% in runs to its three Oklahoma refineries.

Oklahoma and Kansas joined other major producing states with cuts in allowables.

The Oklahoma Corporation Commission ordered an 11% cut in the allowable for March from the January level. Based on January actual runs, the cut will amount to about 58,000 b/d.

In Kansas the March allowable was cut 31,000 b/d, to 310,000 b/d.

More Delay Ahead In Memphis Case

There won't be an early ruling on the Memphis gas rate case by the U.S. Supreme Court.

The court this week refused a government request for an early hearing. This means the case won't be argued before late next fall—at the very earliest.

At stake is a lower court ruling that pipeline companies may not seek rate increases, even though subject to refund, without prior customer approval.

The delay by the high court will have an impact on gas expansion plans.

Already several projects have been postponed, and large steel orders have been canceled.

Banks and insurance companies are refusing to finance some gas projects until the Supreme Court rules.

There is little likelihood of congressional action, either.

Going to Work Here Should Be Fun

Employees of the Vickers Petroleum Co. nominate their home office as one of the prettiest of any in the oil industry.

It's easy to see why, after looking at a picture (above) of Vickridge, the firm's Wichita (Kan.) office. In addition to the beautiful office setting, the estate has a swimming pool, a tennis court, a baseball diamond, and other "clublike" recreational facilities.

Two 'new horizon' projects that stir the imagination are being considered by government scientists. And each would involve the oil industry.

Challenges: Pierce Depth Barriers . . .

Penetration of the earth's unexplored second layer—which no drill bit has even approached—may become a reality in the not-too-distant future.

When this happens, it will be a major step in helping geologists realize their long dream of exploring deep into the interior to learn the secret of the earth's inner structure.

This inner structure is divided by scientists into four general areas—the crust, in which oil is found and recovered; the mysterious second layer, the mantle; then a core; and probably an inner core.

No one knows exactly what lies beneath the earth's crust—which ranges in thickness up to 21 mi. or more.

Geologists believe that even a small sample of the mysterious second layer—called the mantle—which lies just beneath the crust might answer many questions about the earth's composition.

The process of reaching the second layer could prove extremely valuable in developing new oil geology and oil field drilling techniques.

The entrance to the earth's mantle has been termed the Mohorovicic Discontinuity. The "Moho," as it is often called, was discovered by the Croatian seismologist, Mohorovicic, who measured velocities of earth tremors in 1910.

Simply put, the Moho is the area where pulses of sound speed up sharply when sent down to earth, rather than maintaining an average increase of speed, as in the crust. It is a discontinuance, or discontinuity.

Geologists think Moho and the mantle may be composed of perhaps three types of basic rock: dunite, peridotite, and eclogite. Another school of thought, however, believes the mantle may be a glass substance, probably pliable like plastic because of the proven intense heat.

But those are theories. And scientists want to find out for sure. That's why they are eager to get a deep-drilling project under way.

A project to break through the depth barriers is in the planning stage. It is headed by Gordon G. Lill, of the Office of Naval Research, in Washington.

Lill and nine fellow members of the American Miscellaneous Society—a loose-knit group of scientists devoted to such imaginative projects as drilling into the earth's depths—have been asked to form a committee under the aegis of the National Research Council.

Lill hopes to enlist the aid of petroleum geologists, engineers, and oil men who have specialized in deep drilling. Only oil men will be able to determine the feasibility of drilling for the Moho, Lill says.

"The big problem will be an engineering one. Even the thinnest ocean spot, where the crust is only three or four kilometers thick (1.8-2.4 miles) creates a terrific engineering problem."

Lill and his colleagues have been following the success of the CUSS operation—Continental, Union, Superior, and Shell—off the coast of Southern California. The CUSS drilling unit is believed to be capable of going 10,000 feet into the ocean bottom.

The ocean appears to offer the best chance of reaching the scientists' target. The earth's mantle is "beyond our reach" under the continents, Lill says. To reach the mantle by drilling on land, a hole about 21 mi. deep would be needed.

Possible drilling in the Pacific might be on such atolls as Bikini or Eniwetok, where some preliminary drilling—down only some 4,000 feet on Eniwetok—has already taken place in connection with nuclear explosions.

One problem in the Pacific drilling sites suggested so far is that as much as 3 mi. of water would have to be conquered before even the ocean floor could be reached.

Lill and his committee are not discouraged by the odds that face them. They believe oil drilling experience will have much to offer them.

They point out, for instance, that a 30,000-ft. hole might be deep enough—and they note that U.S. oil drilling has already gone within less than 8,000 ft. of that target.

"It seems likely that, with some development and study, means can be found to drill a hole to that depth," Lill says.

Perhaps the biggest problem the committee will have to face is getting money.

Lill estimates that $10-million would be required to reach the Moho. So far, the government doesn't seem to be interested in spending that kind of money.

But the Lill committee hasn't reached the point of worrying about $10-million.

"At the moment, we need about $30,000 to determine whether the project is feasible," Lill says. "If we don't get that money, we'll keep trying to make the determination, only it will be a lot slower going."

. . . Recover Oil by A-Bomb

A top atomic official thinks that underground atomic bomb blasts may prove to be highly useful to the oil industry. The official is Willard F. Libby, a member of the Atomic Energy Commission.

Libby is keenly interested in developing peaceful uses for the atomic bomb. And he feels that the first underground explosion of an A-bomb, last September, has provided a starting point.

Researchers, he says, have come up with some interesting findings and speculations as a result of the test.

More blasts will be made, perhaps late this year, to provide researchers with further data.

Libby thinks that the first practical peacetime use of the bomb is apt to be to step up secondary recovery.

While aware that it's a long step from theory to practice, Libby notes that the powerful bomb could rip open tight oil-bearing formations. And the attendant heat might also be harnessed as a recovery agent.

Scientists also theorize that the bomb's explosion might be used to gasify coal or oil shale.

Libby emphasizes that no one yet

knows what the chemical reactions would be if an atomic bomb were set off, say, in a vein of coal or oil shale. But he thinks gasification would be one possibility—and that other useful reactions might also result.

Atomic bombs conceivably could be used to produce radioisotopes in large quantities, Libby says.

As the use of radioisotopes grows, this could provide a good source, he points out. And it could lower the costs, particularly if the radioisotopes were recovered as a byproduct of a blast set off primarily for another purpose.

There are other possible uses to which the bomb might be put: Large movements of earth, as in digging a new harbor; producing steam, and as an aid in studying the internal structure of the earth through shock waves.

Industry is urged to come up with its own ideas for putting the mighty bomb to work.

"We're trying to keep this thing unclassified, and we'd like nothing better than for some people to come in with well-thought-out proposals on tests for specific purposes," Libby says.

The bombs, in the foreseeable future, must remain under the close control of the government. No one can buy an A-bomb from the government. But Libby promises AEC cooperation to the maximum extent possible.

The test last fall, although made for military purposes, provided some interesting nonmilitary results.

The bomb was exploded in a horizontal tunnel, 7x6 ft., dug 2,000 ft. into the side of a Nevada mesa. Deep within the mountain, the tunnel was curled into a spiral, and the bomb was placed at the very end. It was, as such bombs go, a mere midget. But it crushed 400,000 tons of rock within a diameter of 130 ft.

Days after, this rock was still heated to a point 130 degrees centigrade above normal rock temperatures.

One surprise for investigators was that radioactivity was confined to 700 tons of rock at the very center.

Further information on what researchers learned from the initial underground test may be made available soon.

Dr. Gerald Johnson of the Livermore Laboratory at the University of California is expected to outline progress to date in a Los Angeles speech Mar. 10.

The Livermore laboratory was established last July to aid in developing peacetime uses for the bomb.

What's New / IN THE INDUSTRY

High Court Rules Against El Paso's Merger Plan

The Justice Dept. can intervene to block mergers and acquisitions where antitrust law violations may be involved even though a federal regulatory agency may have "primary jurisdiction."

That was, in effect, the ruling of the U.S. Supreme Court this week in the Justice Dept's suit against El Paso Natural Gas Co. to block its acquisition of Pacific Northwest Pipeline Corp.

The Justice Dept. had filed suit charging that the proposed merger to form an 8,500-mi. natural gas transmission network (PW—Nov.16'56, p32) was illegal under Section 7 of the Clayton Act of 1914.

The Justice Dept.'s action was upheld by a lower court's decision.

El Paso subsequently petitioned FPC for authority to acquire Pacific Northwest. It involved the doctrine that regulatory agencies have primary jurisdiction and asked for a stay or dismissal of the suit.

This week the high court upheld the lower court's decision.

•

A California distributor charges in a treble-damage suit that major companies in California, by "stabilizing" crude production and other practices, conspired to eliminate competition in violation of federal antitrust laws.

The suit filed last week in Federal District Court in San Francisco by Olympic Refining Co. seeks damages of $634-million. Standard Oil Co. of California and General Petroleum Corp. were named as defendants.

But the suit describes as "co-conspirators," Shell, Texaco, Richfield, Tidewater, Union, and the Conservation Committee of the Oil Producers Agency of California.

Olympic alleges that the defendants "conspired" to eliminate competition by "stabilizing" the amount of crude to be produced, by fixing and maintaining uniform and noncompetitive prices to be paid by them for crude produced by independents, by pooling their respective crude transportation facilities for reciprocal use of each of them, by making reciprocal exchanges of crude, by sharing wholesale and retail markets, and by fixing and maintaining uniform and noncompetitive product prices.

•

The Supreme Court will not hear arguments in the government's case against five Gulf Coast states over offshore boundaries until fall.

The court this week scheduled arguments in the case involving Alabama, Florida, Mississippi, Louisiana, and Texas for Oct. 13.

•

British American Oil Co., Ltd., has urged the Royal (Borden) Commission studying Canada's resources policies to consider potential gas reserves as well as proved reserves in deciding on a gas export policy.

The company said it would be "erroneous" to base Canada's future gas availability solely on proved reserves.

British American said its studies indicate that about "four times as much gas will be discovered" in the next 25 years as will be required to meet total Canadian needs and presently authorized export to the U.S.

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Halliburton Oil Well Cementing Co. this week cut some 840 employees from a 40-hour work week to 35 hours.

The reduction affects more than a third of the company's 2,025 employees. Company officials said the cut hours resulted from "current depressed" conditions in the oil industry.

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The Supreme Court upheld a lower court's ruling that the Federal Power Commission can regulate wellhead sales of gas by small producers.

The court refused to review the decision of the Denver appeals court involving Saturn Oil & Gas Co.'s sale of gas from 40 wells in the Hugoton field of Kansas (PW—Nov.29'57, p16).

•

Carroll D. Fentress has taken over as acting director of the Interior Dept.'s Office of Oil & Gas.

The former assistant director succeeds Hugh A. Stewart, whose resignation was effective last week.

Looking Ahead in Washington

McGraw-Hill
Washington
Bureau

March 7, 1958

Congressional strategy is being mapped for an oil imports fight. Top Senate leaders feel sure the fight will come unless the Administration imposes mandatory controls on imported crude oil. A continued voluntary program will be the fuse to light the fire.

Some skirmishing has already started. Sen. Frank Carlson (R., Kan.) has spoken out sharply against the voluntary system. And his views carry weight in the Administration. But there will be equally loud sentiment for the importers, too. So you can expect another compromise if imports legislation is passed. Neither side—producers nor importers—will win a complete victory.

•

Military buyers are betting on a continued drop in crude prices. The Military Petroleum Supply Agency last week accepted some jet fuel bids requiring downward escalation if the posted price of crude oil drops. Since lower bids were available, the action means the military expects crude prices to falter during the contract period—Apr. 1 to Sept. 30.

The Pentagon still must decide its future policy on Caribbean bidders. Foreign refiners in the Caribbean area got a large share of the latest jet fuel awards, but the military is being pressed to limit its offshore purchasing in its next big invitations.

All the military will say now is that it has the problem "under study." This means the Pentagon figures the issue is a hot potato which needs time to cool. Nothing may happen until Congress moves on the trade act.

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The Taft-Hartley ban against closed shops is being enforced. The National Labor Relations Board has cracked down on the construction industry, and already several big companies—including some that specialize in petroleum refinery construction—are refusing to sign agreements with unions that want a closed shop. But there seems to be no danger of construction strikes. Most trade unions are expected to accept the new enforcement.

•

The Senate Small Business Committee is again trying to stiffen antitrust laws. Sen. Hubert Humphrey (D., Minn.) is hearing complaints from small businessmen, including gasoline dealers. Humphrey can be expected to recommend legislation, but Congress probably will be too busy with other matters this year.

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Look for some government indications soon on the extent of the petroleum industry's employment drop. Labor Dept. statistics for January should be released in a few weeks, and will show whether the industry has been hit as hard as the nation generally. Best estimates are that the January total will show more than a seasonal drop in employment. In any event, the new figures are expected to change the upward curve of 1957, when an average of 347,000 were employed.

•

President Eisenhower's latest plug for the gas bill wasn't enough to spur House leaders into action. Until the President indicates he is willing to work for the bill's passage, the legislation probably will lie dormant.

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Deep Tests Drilled with Air and Gas

Air and gas drilling on three significant wildcats in Terrell County, West Texas, has ignited for new interest in use of this method of deep tests.

It's too early yet for a complete analysis to be made, or for any conclusions to be drawn, about the advantages, or disadvantages, of air and gas drilling for similar tests in West Texas. But enough is already known to prove especially valuable to operators drilling, or planning to drill, in that area.

Interest in air and gas drilling, generally, is growing. The current status of the method has just been reviewed by the Air & Gas Subcommittee of the American Assn. of Oilwell Drilling Contractors (PW—Feb. 28'58,p23). A full report of the study will be given next week at the meeting of the American Petroleum Institute's Southwestern District, Division of Production, in Ft. Worth.

The three wildcats are Magnolia Petroleum Co. and Western Natural Gas Co. No. 1 Brown-Bassett; Richardson & Bass No. 1 Goode; and Hunt Oil Co. No. 1 Bustin Canon. All are within a few miles of each other.

Testing continues at Magnolia's No. 1 Brown-Bassett, section 218, block Y, TCRR survey. The discovery, Terrell County's first, was being flowed to clean last week prior to testing through Silurian perforations at 12,387-446 ft.

On the latest test, gas flowed at the rate of 15-million cu. ft. daily through 28/64-in. choke, following acidizing. In earlier tests, the prospect flowed gas from the Ellenburger through eight sets of perforations between 14,010-945 ft. But Magnolia has plugged off the Ellenburger and plans no dual completion, because of mechanical difficulties.

Richardson & Bass No. 1 Goode, section 6, block R, TCRR survey, was drilled to 9,724 ft., where a crooked hole developed. The hole was plugged back to 8,200 ft., with operator whipstocking to drill ahead.

Hunt's No. 1 Bustin Canon, section 5, block 1, TCRR survey, is being abandoned, after reaching nearly 15,000 ft.

Hunt's No. 1 Bustin Canon is believed to be the deepest test ever drilled with air. But a fish at 14,759 ft. forced the operator to begin plugging the hole last week. The air drilling isn't being blamed for the disappointment.

Air drilling started at the surface and was used to 5,600 ft. At that depth, the contractor (Helmerich & Payne, Inc.) ran into water and so switched to mud.

Mud was used to 6,600 ft., at which level pipe was run and drilling with air resumed. This continued to 14,759 ft., when the fish problem arose.

Hunt officials report that the penetration rate was faster than with conventional drilling. But they haven't broken the total down to an average rate as yet. Nor have there been any detailed comparisons with wells drilled with mud in the area.

Three to four rotary compressors were used. The volume of air ranged from 800,000 to 1.5-million cu. ft. per day. Average pressure ranged from 100 to 150 psi.

Special precautions included installation of a special circulating rotating head.

No particular problems arose during the air drilling, with the exception of the water encountered at 5,600 ft. The company says the loss of the hole could have happened in any test, and that this does not affect their opinion of air drilling.

The company will release further information after an accounting is completed, in about a month. Findings will determine whether air will be used in other tests the company drills.

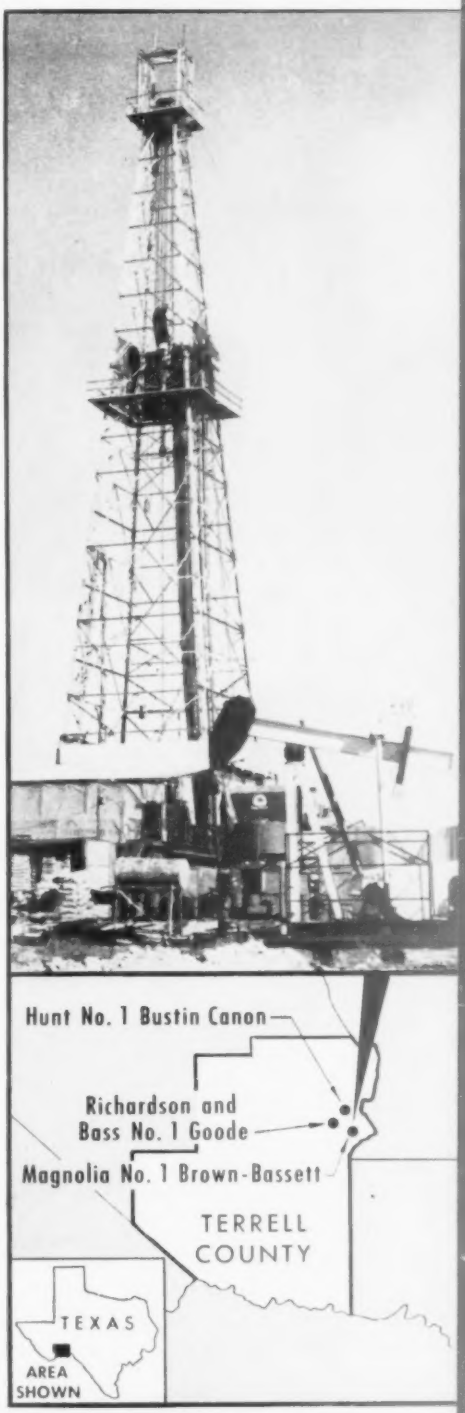
The company feels that release of premature information may be misleading at this time, since air drilling at this depth in this area is still on an experimental basis.

Magnolia's No. 1 Brown-Bassett, the highly significant discovery in the Val Verde Basin, posted some notable savings and speed in drilling with gas from 6,326 to 12,406 ft.

It took a total of 68 days to drill to below 12,000 ft. But it took only 12 days of actual drilling time to drill from 6,326 to 12,406 ft., when gas was used. A Magnolia engineer estimates it would have taken from 90 to 120 days to have drilled the last 6,000 ft. if mud had been used.

On the last 6,000 ft., to 12,406 ft., hole was made at an average of almost 500 ft. a day—including a 390-ft. day when drilling through a 100% chert formation, one of the toughest, and hardest, formations to drill.

Only eight bits were used in the



MAGNOLIA NO. 1 BROWN-BASSETT is one of three deep West Texas wildcats drilled with air and gas, sparking new interest in the method.

gas-drilling phase, compared with the 100 or more that normally would have been used, according to the engineer.

Speed of drilling was due, he continued, to the fact that the gas kept the bits much cleaner at the faster rate. On an 8¾-in. hole at 12,000 ft., he explained, it takes roughly 3½ to 4 hours to circulate the hole using mud; with gas it takes from 5 to 10 minutes.

The No. 1 Brown-Bassett blew out last July, when a gas formation was encountered at 12,406 ft., while gas drilling was in progress.

Fifty tons of drill pipe were blown out before the blowout preventers stopped the blow. The test then caught fire, melting the steel substructure, causing collapse of the rig. The fire burned two days, and caused more than $200,000 damage.

Myron Kinley, the world-famed fighter of oil field fires (PW—Sep.28'56, p38), was aided by 200 Magnolia workers in forcing enough mud down the hole to extinguish the fire. Luckily, no one was hurt, and much of the equipment was dragged out of the fire area, to be used again when drilling was resumed. A new rig, however, had to be brought in to continue drilling.

This experience hasn't caused Magnolia to change its opinion of gas drilling.

The company drilled about 30 tests with air or gas last year, and plans a like number, or more, this year.

A Magnolia engineer says the method has "a great deal of promise," and that the company plans to use it wherever and whenever conditions are favorable.

He adds: "Savings possibilities with air or gas look good, but we think our experience on the Brown-Bassett well was better than we can expect in normal drilling . . .

"Our best guess is that gas drilling can be expected to save only about 10% on the total cost of the well—which is good, but not as spectacular as some may think."

As far as the hazards of such drilling are concerned, the engineer says, Magnolia has changed the arrangement of blowout preventers after making a study of the Brown-Bassett trouble. The company also plans a more intensive schedule of crew drills in blowout prevention.

"In general," the engineer concludes, "we feel that air or gas drilling presents no safety problems that can't be solved by strict precautions and use of the lessons learned from experience."

The company will use gas drilling at No. 2 Brown-Bassett, 1½ mi. south of No. 1. It plans to begin gas drilling at an even shallower depth than the 6,300 ft. employed on No. 1.

Air drilling was used from the start at Richardson & Bass No. 1 Goode. But mud was used in some intervals.

Air was used in drilling the test to 3,705 ft., where water was encountered. Mud was then used to 6,350 ft., where 9⅝-in. casing was set.

Air drilling was resumed and carried to 9,724 ft., the present total depth. That was the point at which the crooked hole developed, and the hole was plugged back to 8,200 ft.

At last reports, the operator was preparing to whipstock and drill ahead again, using mud.

Richardson & Bass engineers aren't taking any definite stand yet on the air-drilling method. But some of them feel the trouble encountered might have been averted if mud had been used.

"Drilling with air is touchy," one engineer said, "especially if you run into a 'drift' in the formation."

Another Richardson & Bass official estimates that drilling with air on this test was 300% faster than with mud, and that there was less wear and tear on bits.

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Panther Creek: Fast Unitization

The Panther Creek Unit, Garvin County, Okla.—recently put into operation by Phillips Petroleum Corp.—has pointed up, by the speed of its installation, the growing acceptance of such unitization projects in the state.

As of now, about 85 unit operations have been approved by the Oklahoma Corporation Commission.

The Panther Creek Hart Sand Unit covers 6,640 acres, held by 650 royalty owners and 38 working-interest owners.

From the time of its inception to the time it went into operation last Dec. 1, the Panther Creek Unit required only 25 months to become a working reality.

Phillips owns 43.3% of the unit. Included among the other owners are Superior Oil Co. of California, Continental Oil Co., Magnolia Petroleum Co., Carter Oil Co., Pan American Petroleum Corp., Sun Oil Co., and Cities Service Co.

Within two weeks after Phillips sent out a letter to the 650 royalty owners outlining the unit plan, more than 56% had signed up by mail.

By Sept. 27, 1957, the date of the hearing before the Corporation Commission—1½ months from the date of the initial royalty owner contract—some 89% of the working-interest owners and 72% of the royalty owners had signed. By Jan. 1, more than 99% of the working-interest owners and over 85% of the royalty owners had agreed to participate.

The swiftness in getting this unit under way is a far cry from the difficulties and delay that accompanied the formation of the first two units in the state, after the 1945 unitization law was passed. Both required long hearings before the Corporation Commission.

Engineers recall that on the West Edmond proposal (made effective Oct. 1, 1947), the full three-member commission heard the arguments for and against unitization from batteries of attorneys and witnesses on both sides.

The same held true for the West Cement-Medrano unit (effective Dec. 1, 1957). After long hearings, the case was eventually carried to the U.S. Supreme Court for a test of the commission's power.

The high court, by dismissing the appeal, in effect affirmed an Oklahoma Supreme Court decision that the law was valid.

By contrast, only one hour of hearing time before the commissioners' examiner was required in getting the Panther Creek Unit approved.

There were only two witnesses, one lawyer, and a dozen spectators in the courtroom when Phillips presented the proposal to the examiner. There was no formal opposition of any kind.

"We were surprised, frankly, that so many of the royalty owners and working-interest owners signed up so quickly," says Phillips. The company had intended to go first to the commission for approval of the proposed over-all waterflood plan for the unit, then contact the owners for approval.

Under unitization, the unit will be waterflooded. The Hart sand—at 7,500 ft.—will be the second-deepest formation to be waterflooded in the state.

The only flood in Oklahoma that taps a deeper formation is the Cities Service Lindsay Unit, in the Bromide pool of North Lindsay field, which is over 10,000 ft. deep.

Phillips engineers explained to the commission that water injection should be started as soon as possible to arrest the decline in production rates.

The unitized acreage, they say, is in the oil rim of a gas-cap pool.

Under the flood program, 21 wells will be used initially for injection.

The field was discovered in 1947, and by 1953 production from the Hart sand had climbed to an average rate of 6,000 b/d. But production started to drop and, by the time the unit was approved last year, was less than 2,500 b/d.

Phillips is currently installing five new ACT units to consolidate 125 tank batteries in an effort to operate the field more efficiently (PW—Feb.14'58,p32).

Testimony before the commission shows that the Panther Creek field, under unitization and water injection, is expected to produce about 14-million bbl. more oil, in addition to an estimated 4-million bbl. that can be recovered by primary means.

"The 14-million-bbl. increase is about equal to the total volume that this pool ultimately would have produced under the normal-type operations being conducted today," Phillips testified.

It has been estimated that about two years will be required for the injected water to fill the void spaces left by the already-produced oil, and not until then will there be any increase in producing rates.

The field will be flooded by "selected sections" over the life of the unit.

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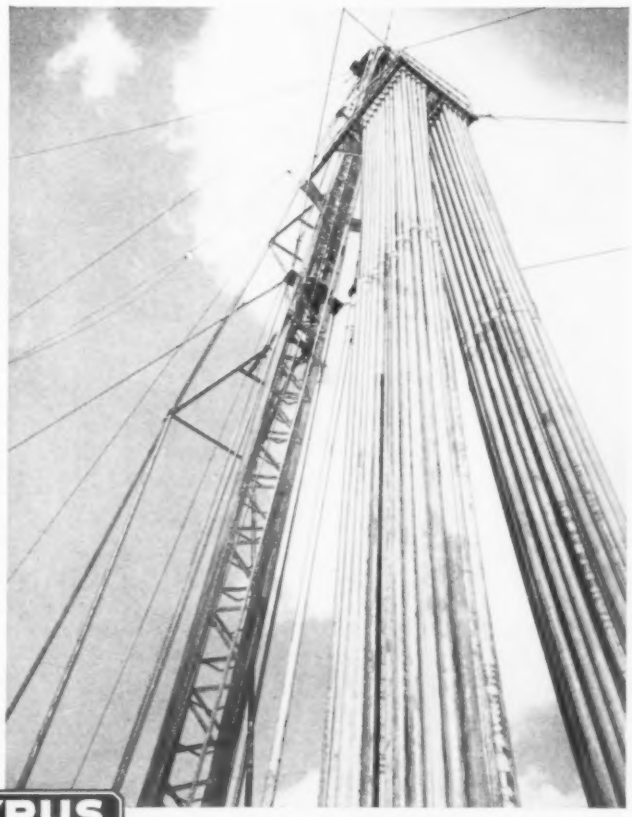

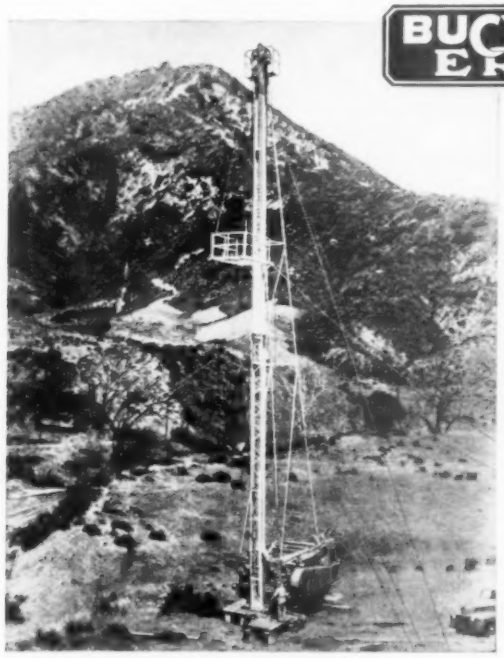

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BUNDLED UP: Shell Oil Co. pumper Jay Hubbell gets set for a cold day's work in Wyoming's South Ashcreek field.

Rocky Mountain

"IN THE ROCKY MOUNTAINS, there are only two seasons of the year, Fourth of July and winter," wryly comments one oil man. Actually, snow and cold last from October through April, depending on local conditions. But this is long enough to add another headache to the job of moving oil out of the ground. The problem: the weather. The solution: complete winterization.

Typical of some of the winterized operations in the Rockies is Shell Oil Co.'s South Ashcreek field, about 20 mi. north of Sheridan, Wyo. The field is in an area protected from wind. Without wind, snow—up to 150 in. of it—piles on the ground and stays there because of sub-zero temperatures.

In the winter, one pumper and a field maintenance man keep about 1,800 b/d of oil moving out of the field. There are no pipelines; oil has to be trucked out.

As in many other cold areas, production equipment must be heavily protected against the elements.

Heater treaters, for example, are covered with glass-wool insulation and aluminum sheeting. Wellheads are enclosed in heated building, and flow lines are buried 5 ft. underground.

Most of the production equipment can be operated from this central building. But, periodically, the pumper and his assistant must make the outdoor rounds from wellhead to tank battery.

For this, they use a truck equipped with survival gear and food, in case of sudden storms.

The men, too, are "winterized." Before working in cold areas, they get special training in winter survival, and must periodically check their survival gear.

INSULATION: Aluminum sheathing, installed by workmen, keeps oil from freezing on its trip to the tank battery.

MOTH BALLS WITHOUT MOTHS? Yes, says Jay Hubbell, they act as a solvent, keep the lines free of paraffin.

Winter: Cold and Snow Set the Pace

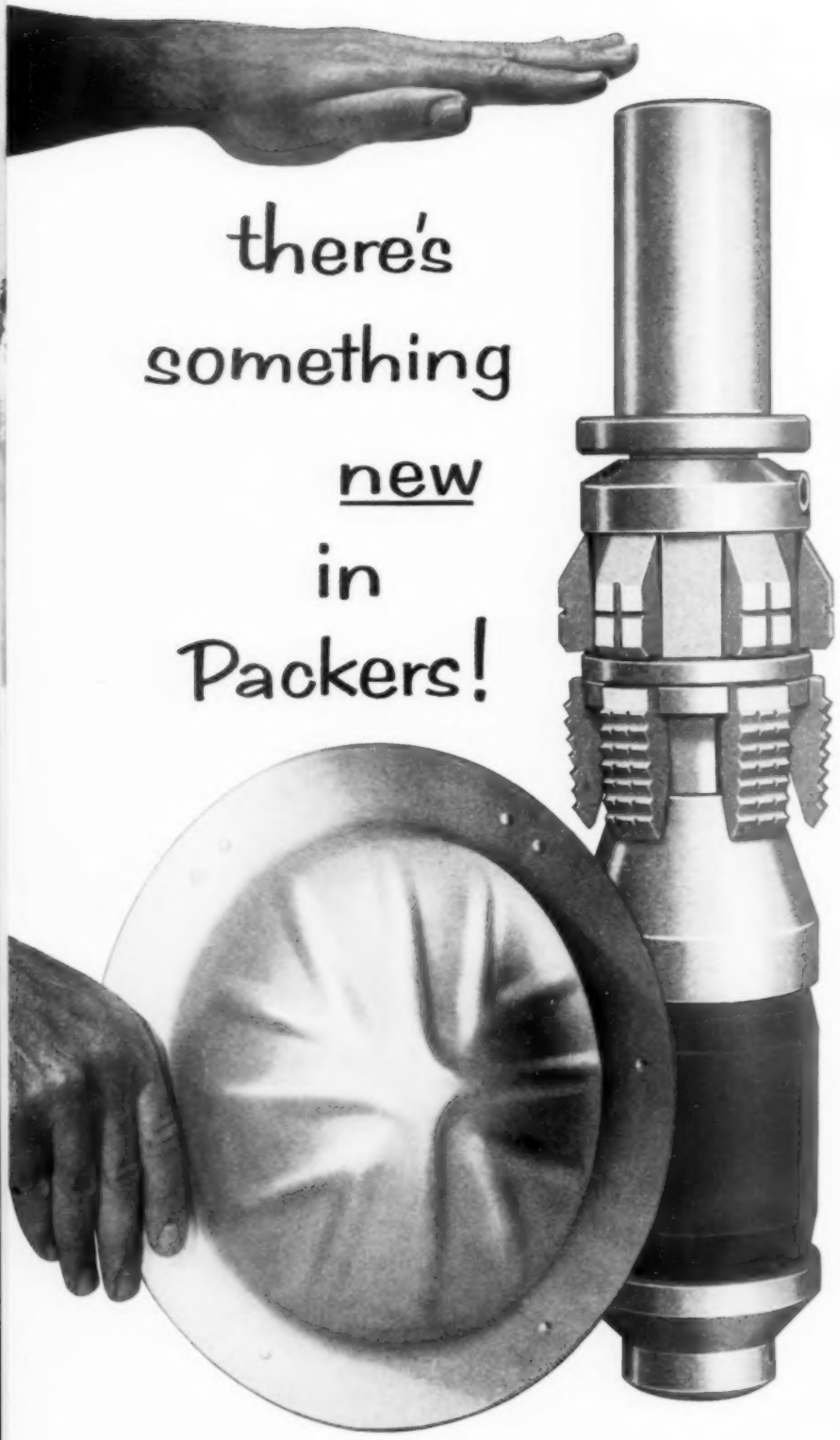
WARM-UP: Jay Hubbell uses a butane torch to warm the flow lines from a tank battery.

FOR SURVIVAL: Before field trips, Hubbell and assistant C. Ferguson check their gear.

ROUTINE: Hubbell checks a well in South Ashcreek field. Wells are operated automatically, but field trips are still needed.

VALVE TROUBLE: Trucker C Williams checks a frozen valve on a truck before it leaves the field.

TANDEM TRAVEL: Trucks work in pairs during snow and ice storms. Here, two head out of South Ashcreek.



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Pacific Test Slated For July

By July 1, Standard Oil Co. of California hopes to spud the first test on a California tidelands lease held jointly with Humble Oil & Refining Co., according to M. W. Morris, of Stancal.

Morris spoke on "Offshore Coring and Drilling Operations" at a recent meeting of the San Joaquin chapter of the American Petroleum Institute.

It should take about two months to drill the first test from a specially built platform, Morris said.

The test will be the first on the 5,500-acre Summerland lease, off Santa Barbara County. The lease—the only wildcat lease awarded in the state under the Shell-Cunningham Act, went to Standard and Humble in January, 1957, for a bonus bid of $7.2-million.

The steel platform—to be set 2¼ mi. offshore in 100 ft. of water—is now being built in the National Steel & Shipbuilding Co. yards in San Diego.

It was decided to use a platform, Morris said, when economic studies indicated that platforms were cheaper in depths greater than 50 ft. Filled islands are cheaper in shallower water, he said.

The main deck of the platform will rise 55 ft. above the ocean, and will rest on four caissons.

The caissons, each 27 ft. in diameter, will be positioned by jetting action.

After the platform is in position, the caissons will be filled with solid material, probably concrete.

The working area will be 110 x 110 ft. A 140-ft National 80 rig will permit simultaneous operation of two rotaries. Stancal, however, plans to start drilling operations with only one rotary.

The contract for the drilling work has been awarded to Western Offshore Drilling & Exploration Co.

If production is found, the derrick, drilling equipment, and a heavy-duty crane will be removed from the platform. A light gin pole will be installed for production work. Wellheads will be positioned in a secondary floor formed by the transverse girders of the platform.

Stancal and Humble will have spent more than $12-million on the job before they know if there is production, Morris reported.

This includes the lease bonus, more than $2-million for the platform, and additional money for coring and other evaluation work.

Before submitting a bid on the lease, the companies drilled two core holes on the property, one to 1,500 ft. and the other to 2,500 ft.

There was no evidence of hydrocarbons in either hole, Morris said.

After getting the lease, the companies drilled two additional core holes.

No production was taken from either hole, Morris said, and no formation tests were made. Information came from cores, electric logs, and sidewall samples.

The Stancal-Humble platform will be the first steel platform to be erected for the development of offshore acreage off California.

Of the approximately 40,000 b/d of the state's production that comes from the tidelands, all but 3,000 b/d is obtained from wells that were drilled from piers or slant-drilled from land locations.

The 3,000 b/d comes from Monterey Oil Co.'s island at Seal Beach, where Monterey is acting as operator for its interest and that of The Texas Co. (PW—Nov.22'57,p20).

The only other island or platform activity in California is taking shape at Richfield Oil Corp.'s island near Rincon (PW—Jan.17'58,p24).

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

Radioactive Waste For Secondary Recovery?

A possibility that radioactive waste may open up new secondary recovery methods is being investigated by Dr. George W. Crawford, University of Texas physicist.

"Injection of radioactive waste materials in some carefully chosen reservoirs should result in a new recovery method, and offer a safe way to store radioactive waste," says Crawford.

"Gamma radiation bombardment of the crude oil," he says, "breaks the bonds holding the heavy molecules together, thus causing the formation of lighter molecules from the heavy molecules. The resulting condition decreases the oil viscosity and permits recovery by a secondary process."

•

Navajos Reject Bids

The Navajo Tribal Council has rejected bids on six tracts in the Aneth and Desert Creek areas of San Juan County, Utah, on the ground that the price was not high enough.

The action has caused concern among certain oil operators, some of whom allege that the tribal council successfully "sweated out" a reported discovery by Phillips Petroleum Co. on acreage leased from Aztec Oil & Gas Co.

The test is between two fields in the Desert Creek area. No information has been released by either Phillips or Aztec, pending award of the bids on adjacent tracts, for which bonus money was offered at the Dec. 10 lease sale.

Bids for these tracts ran as high as $250,000. Among the bids rejected were Mohawk Petroleum Co.'s bid of $108 per acre on tract No. 8; bids of $318.75 per acre by Sinclair Oil & Gas Corp. et al on tracts No. 9 and 26; and bids by Phillips and Aztec on tracts No. 15, 17, and 21. The council did accept the bid of Sinclair et al on tract No. 10. All the tracts covered 160 acres except tract No. 10, which was 80 acres.

Maurice McCabe, executive secretary of the tribal council, says the bids were rejected "because they were not as high as others in the area." The lands in question carried a 1/16th royalty.

McCabe says the tracts will be reoffered for bidding, possibly at the Mar. 19 lease sale.

•

Properties Change Hands

Oriental Refining Co., integrated company operating mostly in Colorado, has sold its assets to Flank Oil Co., Billings, Mont.

Flank is a crude oil producing subsidiary of Asamera, Ltd., a natural gas distribution firm in Alberta.

Max Zall, Oriental vice-president, said the sale was for more than $6-million, and involved no stock transfer. Oriental's name and marketing operations in Colorado and Wyoming will remain unchanged.

Seminole Oil & Gas Corp. and Olsan Bros., Inc., of Dallas, have bought a 50% working interest on 1,360 acres in Stephens County, West Central Texas.

Harry D. Mencher, Seminole president, says that a drilling program will start on the property in April, aimed at the Mississippian.

Texam Oil Corp. has purchased a 10% stock interest in Angelus Oil Co., and an equal interest in 500 acres in the Los Angeles Basin area, in California.

The purchases were made from Allen Guiberson, Dallas.

Texam says the California venture will mark the company's first activity outside Texas and Oklahoma.

Angelus Oil Co. holds an additional 2,000 acres under lease in the Los Angeles Basin area.

•

Oil men have lost the battle of the ballot in Hermosa Beach, Calif. Citizens voted down an ordinance that would have repealed an old law banning oil exploration within city limits.

By a vote of 2,325 to 1,815, residents upheld an ordinance dating from 1929.

Shell Oil Co. and Continental Oil Co. had offered to pay the city an outright bonus of $8.6-million for offshore drilling rights, and an additional $2.6-million for onshore rights in certain areas.

Proponents of the measure and

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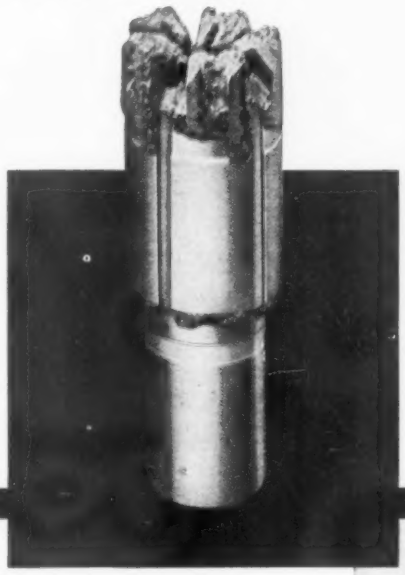
*Patents pending.



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residents opposed to opening any part of the city to drilling conducted one of the liveliest campaigns in the city's history.

Spokesmen for Shell and Continental said they hoped "the people of Hermosa Beach will take some future opportunity to vote on oil drilling and act affirmatively to permit Hermosa Beach to develop its oil resources, which now appear to be suffering drainage from adjoining development at Redondo Beach."

•

The U.S. Government has undertaken formal defense of title on Indian lands in the Aneth pool area, which have been claimed by the state of Utah.

The suit, filed in U.S. district court, names the state, George N. Larsen, Western States Refining Co., T. W. Notesting, Continental Bank & Trust Co., and Honolulu Oil Co. as defendants.

The federal government alleges that the land in question—several thousand acres—was originally granted to the state in 1900 as a school section within the federal public domain. In 1924, it says, the state selected other lands to replace those sections within the Indian reservations and that, therefore, title reverted back to the federal government, which made the area a part of the Navajo Indian reservation (PW—Dec.27'57,p15).

The state contends that, while the surface may have been given to the Indians, mineral rights were retained under terms of a state law, passed in 1917, which prohibits conveyance of mineral title on school land. The state maintains that the federal government itself did not grant mineral rights on the acreage given Utah outside the reservation.

•

The New Mexico Land Commission will hold a sale of oil and gas leases Mar. 18.

The commission will offer 37 tracts in five counties.

At a special land sale two days later, the commission will offer 35 tracts in 13 counties.

•

The Alabama Oil & Gas Board has extended the spacing pattern for deep wells at Citronelle oil field from 40 acres to 160 acres.

The board defined deep wells as those located below the now-producing upper and lower Donovan pools (below 12,000 ft.) in the field, which now has 114 producing wells.

Members of the board approved the pattern after attorneys for Seneca Development Co., Gulf Oil Corp., and others asked for the wider spacing.

Indications are that the approval will bring an early deep test—possibly to the Smackover.

•

A unitization plan estimated to boost oil recovery by as much as 500,000 bbl. has been approved by the Texas Railroad Commission.

The plan calls for injecting water into the Thomas sand, found at a depth of 1,150 ft., in Archer County, North Texas. Magnolia Petroleum Co. filed the request.

Waterflood projects were also approved by the commission for several other fields.

These included Brock (Cook sand) field, Callahan County; South Dove (Strawn) field, Cooke County; Goldsboro (Gardner) field, Runnels and Coleman Counties; and three leases in the Gunsight reservoir, Young County.

•

Cities Service Oil Co. has asked the Texas Railroad Commission for a higher allowable for wells on its Hughey "AB" lease, Panhandle field, Gray County.

The commission some time ago authorized a miscible-fluid injection project for the lease. Two wells are being used for LPG injection. Cities Service, says production has been stimulated to the extent that some wells now are exceeding the top allowable of 51 bbl.

•

Three automatic custody transfer systems have been approved by the Texas Railroad Commission on a six-month trial basis, as exceptions to statewide Rule 21.

All three are systems of The Texas Co. One is designed for its Boney NCT-1 lease in the Panhandle field, Carson County. Another would operate on the Cogdell Canyon Reef unit in the Cogdell field, Kent and Scurry Counties, West Texas. The third is proposed for the Pierce Estates "C" lease in the North Withers field, Wharton County, Texas Gulf Coast.

•

A bill now before the Arizona legislature would assess a 2% levy on oil and gas production in the state, payable on market value at the well.

The proposal is in anticipation of oil production in Arizona's sector of the Four Corners area.

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Drilling Highlights

Nebraska—Brack Drilling Co. No. 1 Hudson, section 1-1n-34w, Hitchcock County, was completed as a Pennsylvanian discovery, pumping 65 bbl. of oil and 4 bbl. of water in 8 hours through perforations at 4,082-88 ft. in the Lansing-Kansas City. The well is 23 mi. northeast of production in Dundy County.

In Cheyenne County, Raymond Oil Co. No. 1 Mather, section 1-16n-52w, was completed on the pump for 200 b/d through J sand perforations at 5,179-86 ft. The discovery is 3½ mi. northwest of Graham field.

Wyoming—General Petroleum Corp. No. 22X-17 Trojan, section 17-26n-113w, Lincoln County, was completed as a Frontier (Cretaceous) gas discovery 2 mi. southeast of LaBarge oil field. The well flowed 1,934,000 cu. ft. of gas daily through ¾-in. choke and perforations at 7,302-686 ft. in the Second Frontier.

West Texas—Texas Pacific Coal & Oil Co., No. 1 O. H. McAlister, section 32, block 37, township 1 south, T&PRR survey, Devonian lime discovery in Midland County, flowed 281 b/d of 47-gravity oil through 18/64-in. choke and perforations at 11,294-410 ft. The well is 5 mi. northeast of Germania field.

Utah—Continental Oil Co. reportedly has set pipe at its two wildcats in San Juan County. The wildcats are No. 1 Federal-Miller, section 8-38s-22e, and No. 1 Federal-Carter, section 34-38s-22e. The first of these tests is 14 mi. west of Hatch Unit production. The other is 8 mi. northwest of Bluff Unit production.

Louisiana Offshore—Zapata Offshore Co. and Felmont & Associates No. 1 State Lease 1446, OCS 0172, block 86, Vermilion area, was completed for 3.6-million cu. ft. of gas daily and 113 b/d of 50.4-gravity distillate through 12/64-in. choke.

Gulf Oil Corp. has staked location for a wildcat in block 131, OCS 0457, South Timbalier area. The test will be in 145 ft. of water, surpassing the previous mark of 137 ft. set by the CATC group in block 70, West Delta area.

Colorado—Stuarco Oil Co., Al Goodwin, and Lewis Bros. No. 1 Doll,

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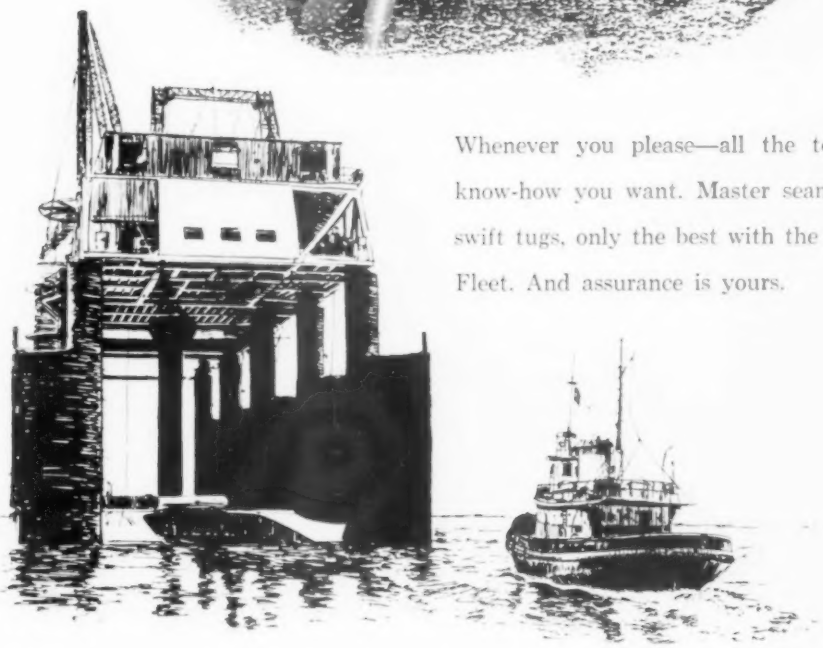

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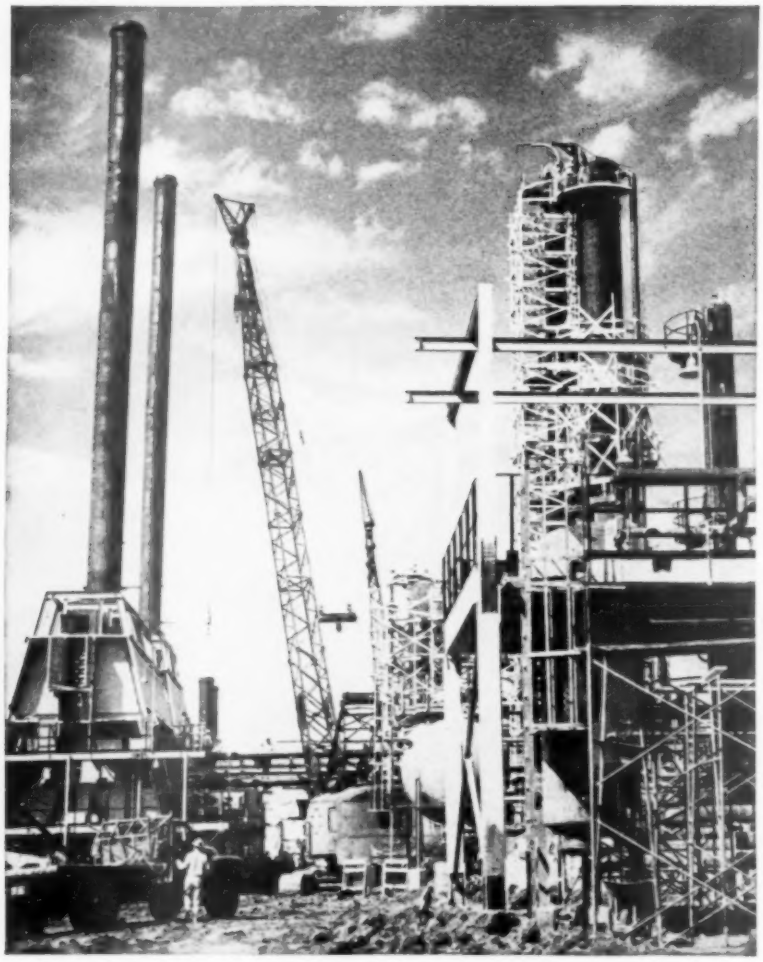

CATS MULTIPLY FAST IN CANADA

Nowhere is Canada's swift industrial progress more striking than in the recent development of its oil refining and petrochemical facilities. Canada's daily refining capacity already approaches 700,000 barrels. New petrochemical plants are rising from coast to coast, to meet the demand for paints, alcohol, ammonia, plastics, detergents, synthetic rubber and other products of petroleum or natural gas.

U. S. executives interested in any branch of the oil and natural gas industry in Canada will find a useful ally, and a prompt, dependable source of information in The Canadian Bank of Commerce. Write or telegraph direct to C. H. Munro, Manager, Petroleum and Natural Gas Department, 309 Eighth Avenue, West, Calgary, Alberta, or to our Business Development Division, Head Office, Toronto 1, Canada.

(*We regret that we cannot advise on the merits of oil or mining securities*)

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section 35-7n-58w, Weld County, was completed for 320 b/d through ¾-in. choke and perforations at 6,213-21 ft. in the D sand. The discovery is 1½ mi. south of Grail field.

North Texas—Woodson Oil Co. No. 1 R. W. Fails, section 2419, TE&L survey, A-596, Archer County Mississippian discovery flowed 502 b/d of 42.8-gravity oil through 12/64-in. choke and open hole at 5,135-72 ft. Location is in an old shallow-pay area.

Oklahoma—Sinclair Oil & Gas Co. No. 1 Phillips, section 5-23n-19w, Woodward County, flowed 5,020,000 cu. ft. of gas daily through ½-in. choke and perforations at 7,413-32 ft. in the Morrow. A flow of 40 bbl. of 53.5-gravity condensate also was gauged in 14 hours through the ½-in. choke. The wildcat is 1½ mi. east of Northeast Woodward pool.

In Beckham County, Shell Oil Co. No. 1 Patten, section 9-9n-22w, was completed as a Des Moines (Pennsylvanian) discovery in the one-well North Carter pool, in which the original pay was Springer gas at 10,100 ft. The discovery flowed 157 b/d of oil and 20 b/d of water through 12/64-in. choke.

North Dakota—Anschtuz Drilling Co. No. 1 Christensen, section 7-158n-81w, Renville County Mission Canyon discovery 23 mi. southwest of production at Newburg field, was completed on the pump for 107 b/d through perforations at 4,473-77 ft.

Also in Renville County, Gulf Oil Corp. No. 1 Busch & Nemaha Royalty, section 3-16n-85w, was completed on the pump for 245 b/d of oil and 10 b/d of water. Production is from the Mission Canyon, topped at 4,183 ft. The discovery is 5 mi. northeast of Bluell field.

Montana—Holland-American Petroleum Co. No. 1 Gray, section 34-2n-31e, Stillwater County, was completed for 900,000 cu. ft. of gas daily through perforations at 2,910-20 ft. in the Frontier. The well is 2 mi. south of another gas discovery by this operator at No. 1 Castle, section 22-2n-21e, completed for 4.5-million cu. ft. of gas daily from the Frontier and 450,000 cu. ft. daily from the Eagle.

South Louisiana — Anderson-Prichard Oil Corp. No. 1 Waterford, section 4-13s-22e, St. Charles Parish, was completed for 18 b/d of 40.6-gravity oil through ⅛-in. choke and perforations at 10,044-46 ft. The discovery is 3 mi. west of the Avondale field.

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Goats Give Way to Refining Center

(Eighth in a series of on-the-spot Venezuelan reports)

AMUAY—This bleak, wind-swept Peninsula of Paraguana—where a West Texan would feel at home amid the mesquite and cactus—is one of the fastest growing oil refining export centers in the world.

Four years ago its processing capacity stood at 250,000 b/d. Today, it has jumped to 540,000 b/d. By summer, it will be up to 640,000 b/d.

At the end of the war, before the two giants of the Venezuelan oil industry—Creole Petroleum Corp. (Jersey Standard affiliate) and Shell—decided to build refineries here, this was as desolate a spot as you could find.

The peninsula, which juts out from the mainland into the Bay of Venezuela on a thin ostrich-like neck, is flat, parched, and monotonous.

It has only two features. One is goats—literally thousands of them (one recently shut down a crude oil still by chewing up the cables). The other is an incessant wind, that serves as a useful "air conditioner," but makes one's hair stand on end and gives people a permanently surprised look.

Today, Paraguana is still no paradise. But the oilworkers now well outnumber the goats (an estimated 70,000 to 80,000 people are connected with the two refineries, plus a small terminal belonging to Mene Grande).

And life is quite comfortable—both at the trim, new community that Creole is carefully nurturing under a generous home-ownership program, and at the handsome, longer-established Shell camp.

* * * *

And here, perhaps more than elsewhere in Venezuela, you can see the direct dependence of this country's oil industry on the markets of the U.S. and Europe.

For instance: A fourth crude oil pipestill was rushed to completion last September by Creole in anticipation of expanded exports this winter. Result: It has remained virtually unused so far.

And the huge, open pits (picture) that were filled to the brim with heavy fuel oil in preparation for strong demand from industries on the U.S. East Coast and in Europe this winter have been drawn down—but not as rapidly as expected.

* * * *

None of this, however, seriously perturbs the enthusiastic and personable, young (41) Creole refinery manager, Hugh de N. Wynne (picture), who hails from Montclair, N. J. (Mrs. Wynne, a Venezuelan, says she thought American oil men came only from Texas or Oklahoma before she met Hugh.)

Wynne, whose experience with Creole since 1940 has ranged all the way through geology, drilling, tanker expediting, industrial relations, and public relations before he got his new refinery post, points out that the slackening in demand is only a temporary problem.

"It's only a matter of time before demand catches up," he says. "Eventually, we may need even more capacity."

The growth of Creole's Amuay refinery has, indeed, been phenomenal. When it opened in 1950, it was designed for only 60,000 b/d. But it has been expanding almost continually ever since. Today its capacity is officially rated at 338,400 b/d (though actual crude runs are currently running at only 260,000 b/d).

Thus, this refinery already outstrips, by a hair, the largest plant in the U.S. (Esso Standard's Baton Rouge refinery, with its officially rated capacity of 336,000 b/d).

And it rates among the world's three largest refineries (with Aruba and Abadan).

Because demand from the U.S. and Europe, the chief markets, is primarily for heavy fuel oil, the plant is designed for a high residual fuel yield (55%). But it also produces a complete range of high-quality products, and features Latin America's only Fluid Hydroformer, plus a newly opened Hydrofiner for desulfurizing diesel fuels. A 700 b/d lube oil plant will be opened shortly, and the company is also experimenting with manufacture of multicolored asphalt.

* * * *

Rapid expansion is the keynote, too, at the Shell refinery, located at Punta Cardon—a few miles to the south, and clearly visible across the bay from Amuay.

A fourth crude distillation unit is being added, which will increase Punta Cardon's capacity from the present 205,000 b/d to 300,000 b/d. The unit is slated to be completed in May or June.

The refinery also features a newly opened 35,000 b/d catalytic cracker that is the pride of W. F. Mackie (picture), whose Scots burr has not been tempered by 17 years in Venezuela nor by long service with Shell in Mexico prior to that. The plant also includes thermal cracking and reforming facilities, plus a 3,500 b/d lube oil plant.

Thus, by summer, the Paraguana Peninsula will have a processing capacity of nearly 640,000 b/d—more than the oil, established Aruba-Curacao area of the Caribbean, and nearly three times as large as the refining capacity of all the rest of Venezuela combined (230,000 b/d).

These two plants alone will be capable of processing nearly one-fourth of Venezuela's entire crude oil production (2.8-million b/d in 1957).

OCEANS OF FUEL OIL for U.S. and European markets are stored in two giant open pits, with total capacity of 12.3-million bbl., at Creole's huge, mushroom refinery at Amuay Bay (top).

AGAINST A LAKE OF FUEL OIL, Hugh de N. Wynne (left), Amuay refinery manager, points out second coral-rock storage pit to Wanda Jablonski, Petroleum Week senior editor.

AT NEARBY SHELL REFINERY, general manager W. F. Mackie (left), keeps close tabs on new expansion program. ▶

DEPT/Transportation & Storage

NPC Measures Transportation Growth

The most comprehensive report yet on the changing picture in U.S. crude and product transportation facilities has just been released by the National Petroleum Council.

Early last year NPC was asked by the Interior Dept.'s Office of Oil & Gas to "make a comprehensive study of domestic petroleum transportation facilities," together with "recommendations and comments."

The department felt that such an up-dating report could be of great value to the Administration, especially in the event of national emergency.

In response, NPC's Transportation Committee has put together an 87-page report summarizing all petroleum transportation facilities in existence, under construction, or planned in the U.S. as of Sept. 30, 1957.

The report does not include data on tankers.

And it does not include the planned increases in crude and products transmission capacity announced after Sept. 30—such as the Jayhawk crude line. The use of the Little Inch Line in product service is not included in the figures either.

When contrasted with earlier NPC figures, the report shows how fast U.S. pipeline capacity has been growing.

The Interior Dept., back in 1950, asked NPC for a similar summary of U.S. petroleum transportation facilities. Unfortunately, the two studies weren't carried out in strictly the same manner, so point-by-point comparisons of their conclusions can't be made. But some analysis of general trends can be made by careful comparison of the two reports.

"The principal pipeline movement of crude in the U.S., from producing areas in PAD Districts II and III refineries in the Mid-Continent and to Gulf Coast refineries and marine terminals," has grown considerably since 1950, the report indicates.

The District III (Texas-Louisiana) crude line capacity accounts for the major share of this flow. This capacity now stands at 1,221,000 b/d from the district's producing areas to District II (Mid-Continent area), and 4,140,000 b/d from the producing areas to the Gulf Coast.

In 1950, crude line capacity from District III producing areas was 1,000,000 b/d to District II and 2,300,000 b/d to the Gulf Coast (chart).

And crude line capacities to Great Lakes and Wood River (Ill.) refineries, both in District II, have now reached 1,373,000 b/d and 737,000 b/d respectively. Most of this capacity is from producing areas within District II, although crude lines from Districts III and IV and from Canada also deliver there.

Other districts have also had significant crude line capacity increases.

In District I, for instance, the line from Portland, Me., to Montreal, which is the only major crude line in the district, had its capacity increased from 127,000 b/d to 257,000 b/d in the seven years between NPC reports.

Crude capacity out of District IV, the Rocky Mountain region, climbed from 60,000 b/d to 392,000 b/d during the period.

District V (West Coast and Far West) crude lines now have a combined capacity of about 1,583,000 b/d, all of which is used to carry California crude to intra-state refineries and marine terminals. In 1950, this figure was 1,018,000 b/d.

Completion of the Four Corners to Los Angeles crude line late this month will add 60,000 b/d to District V capacity—and make for the first major interstate crude shipment in the district.

"The greatest network of product pipeline is found in District II," says NPC. The district is now served by product lines from other districts with a combined capacity of 478,000 b/d, and by intradistrict product lines with a total capacity of 729,000 b/d.

Products are received into District II, the report finds, "from other districts through pipelines with the following capacities: 133,000 b/d from District I, 335,000 b/d from District III, and 10,000 b/d from District IV.

In 1950, NPC reported that product lines into District II had these capacities: 69,000 b/d from District I, and 73,000 b/d from District III (chart).

Of the present intra-District II product line capacity, 458,000 b/d is available from the Oklahoma-Kansas areas northward throughout the north central states; and 271,000 b/d exists between the Oklahoma-Kansas area and the lower Great Lakes region.

The NPC study includes the Laurel System from Philadelphia to Pittsburgh and Cleveland, and the Wabash system from Wood River and Robinson, Ill., to Chicago under "principal product pipelines proposed or under construction."

The report also shows the rapid growth of LPG pipelines.

LPG transportation, at the request of the Office of Oil & Gas, is treated separately in the report.

In 1956, 6.6-billion gal. of LPG were shipped in the U.S., the report says. Almost 90% of this was handled by tank trucks and tank cars, while pipelines moved 7.4% and barges a little more than 1%.

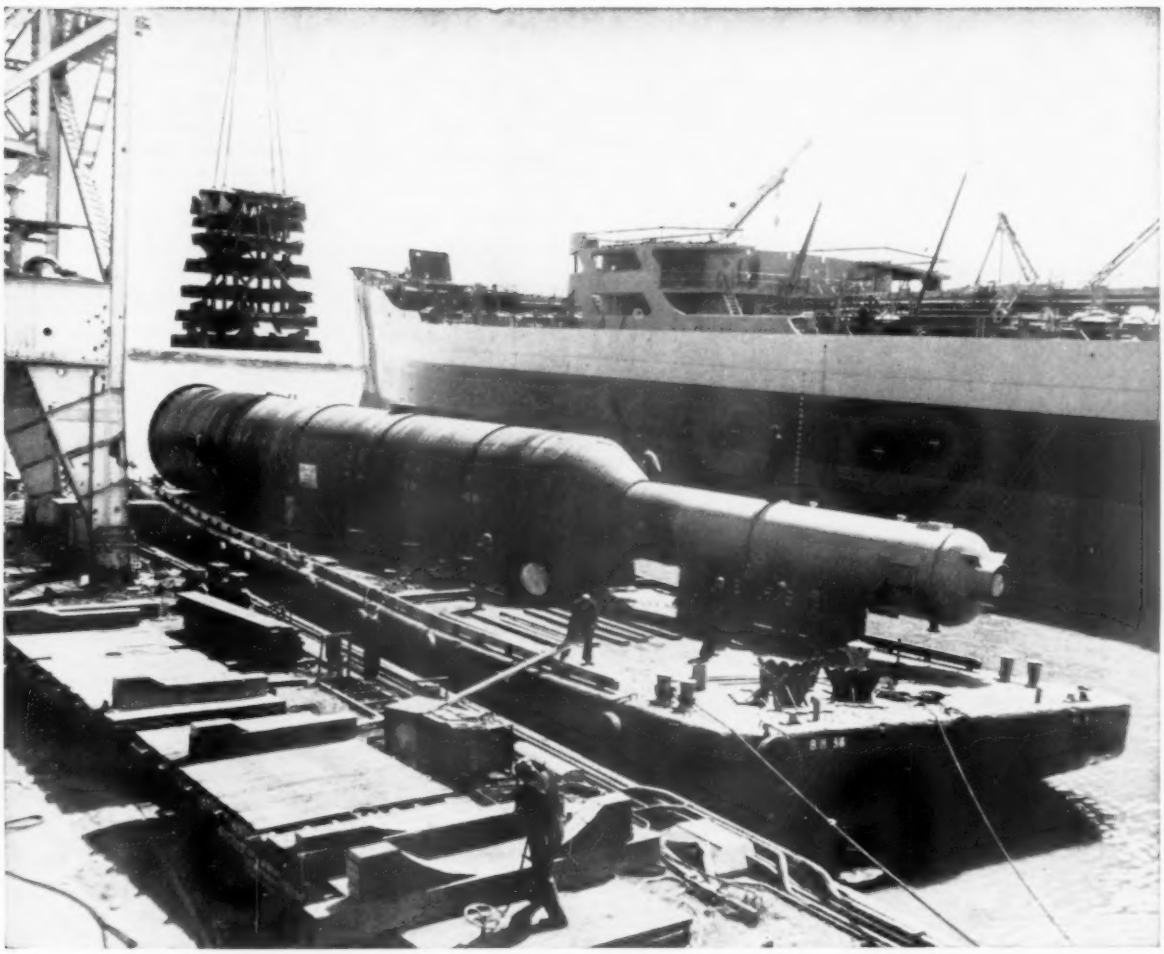
However, NPC figures show that pipeline shipments of LPG increased from 1952 to 1956 at a much greater rate than other means of LPG transportation. In 1952, pipelines moved only 96-million gal. of LPG, only 2.2% of the total. The 7.4% of total 1956 LPG transportation that went to pipelines meant a movement of 490-million gal.

NPC lists as LPG lines "proposed or under construction" Magnolia Pipeline Co.'s 6-in. line from Cameron Meadows, La., to Beaumont, Tex., and Interstate Oil Pipeline Co.'s 8-in.

How much have pipeline capacities grown

Here are two good examples:	1950	1957
	(figures in b/d)	
Crude capacity out of District III		
To District II	1,000,000	1,221,000
To Gulf Coast	2,300,000	4,140,000
Product capacity into District II		
From District I	69,000	133,000
From District III	73,000	335,000
From District IV	—	10,000

Data: National Petroleum Council



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line from Baton Rouge to Sorrento, La.

It does not list what could be the longest LPG line of all—the 2,000-mi. line proposed by two railroads to be built from the Houston area to northeast markets, because the line was announced in October (PW—Oct.18 '57,p12).

Tank trucks are increasing in number and in capacity, according to the NPC study.

Some 41,837 over-the-road, general-purpose tank trucks, trailers, and trains are now estimated to be in petroleum service. The trucks have a total capacity of 242,719,383 gal., for an average capacity of 5,802 gal.

An NPC census in 1955 found that 31,012 units of this type were then in petroleum service, and that they had a total capacity of 174,275,550 gal., for an average capacity of 5,620 gal.

Railroad tank car capacity for crude and products is growing steadily too, NPC researchers found.

As of Jan. 1, 1957, NPC found, 163,059 tank cars were available for general purposes, with 96,074 tank cars identified as being in petroleum service.

In 1950, there were only 116,000 tank cars available, with some 81,000 in petroleum service.

The number of barge and lake tankers in petroleum service has remained relatively steady. But they have a larger combined capacity now than in 1950.

Again as of Jan. 1, 1957, there were 2,138 nonpropelled and self-propelled barges and small lake tankers, capable of moving 21,932,520 bbl. of petroleum produces not including LPG.

In 1950, 2,127 such vessels were available to carry 18,401,513 bbl. of such cargoes.

What's New / IN TRANSPORTATION

El Paso-Pacific Northwest Merger Case Delayed

It's now possible that the government suit against the merger of El Paso Natural Gas Co. and Pacific Northwest Pipeline Co. won't be tried until fall.

The U.S. District Court for Utah, which is trying the case, recently vacated the trial date set for this week. Judge Willis E. Ritter gave El Paso and Northwest until Apr. 1 to furnish the court with additional documents pertinent to the case.

Subsidiary legal problems that must be settled before trial begins, attorneys feel, also make it unlikely that the trial will get under way before the court's summer recess.

•

LPG Tankers Planned

Large-scale overseas movement of LPG may be coming faster than most expect.

American, Italian, and German firms have reportedly just joined hands in a project to build several special tankers to run liquefied propane and butane from the Middle East to Germany.

A shipyard is reported being equipped at Leghorn, Italy, to build prefabricated ship bottoms and tank structures for the Conditioned Power Co. of Rome (which represents General Motors Corp. in Italy). The prefabricated structures would then be trucked to Hamburg to be assembled and fitted with engines from Howaldt Werke, of Hamburg.

The special tankers, with a reported planned capacity of 47,000 tons, would be in the service of Marine Transport Lines, Inc., of New York.

•

Canadian pipeline contractors are beginning to worry about the possibility of severely restricted sale of Western Canadian crude, and a delay in obtaining large markets for gas from the same area.

That was the sentiment expressed at the recent meeting of the Canadian Pipe Line Contractors Assn. in Victoria, B.C.

Speakers at the meeting warned that Canadian contractors' spreads may be idle by 1959 unless action is taken now to start planning for a pipeline to move Western Canada's crude to the Montreal market.

Because it may be up to two years before the Borden Commission can make recommendations about further sales of Canadian gas to the U.S., the association is also asking for interim reports from the commission.

•

The Texas Co. has just launched the first of three 46,000-ton tankers scheduled to go into its service this year and early next year.

Last week, the "Trinidad," a vessel with a 395,600-bbl. crude capacity, was christened at the Sparrows Pt. (Md.) shipyard of Bethlehem Steel Co.

•

The Federal Power Commission will begin hearings next week on a consolidated expansion of Transcontinental Gas Pipe Line Co., Texas Eastern Transmission Corp., and New York State Natural Gas Corp.

The combined $152-million proposal includes construction and operation by Transcontinental of 556 mi. of main line, 490 mi. of laterals, and 48,850 compressor hp. in Louisiana and Texas.

Transcontinental and Texas Eastern also propose to buy interests in two Pennsylvania fields from New York Natural, and to build and buy about $11-million in storage facilities.

•

El Paso Natural Gas Product Co.'s Verde-Gallup crude gathering system in New Mexico is under construction. The system, which will be connected to the Four Corners-to-West Coast line, is now scheduled for completion Apr. 1.

By routing Verde-Gallup crude into the Four Corners line, El Paso will insure a supply of Bisti field crude for its nearby Ciniza refinery (PW—Jan. 10'58,p45).

All other Bisti crude is being earmarked for the Four Corners line.

•

Continental Pipe Line Co. plans to spend $430,000 on expansion of its Rocky Mountain crude pipeline system.

The company intends to build three pump stations on its system in Wyoming—one at Cheyenne, another at Little Bear, and a third at a point 56 mi. north of Cheyenne. A 100,000-bbl. terminal will also be built at Cheyenne.

DU PONT *Petroleum Chemicals* NEWS

Number 85 in a Series of Bulletins for the Petroleum Industry

MARCH 1958

ANOTHER DU PONT SERVICE...

New bulletin service provides tips on additives handling

The chief aim of our newest service is to make the use of additives as easy and economical as possible for DuPont customers.

As a leading supplier of tetraethyl lead and other petroleum additives, the DuPont Petroleum Chemicals Division employs a staff of engineers who are also additives handling specialists, the "Operations Group." These men have had broad experience in their field. To pass their know-how along to you in the oil industry, we now issue, from time to time, "Additives Handling Bulletins."

THE NEW series of additives handling bulletins will be available to you in this convenient filing folder.

OVER

BASIC RESEARCH IS A NEVER-ENDING PROJECT AT DU PONT

Last year, the DuPont Company spent approximately $15 million for *basic* research alone—research into unexplored spheres of chemistry.

The expenditure represents nearly 20% of the company's total investment, almost $80 million, in research and development. Last year marked the 30th anniversary of our basic research program, which has yielded new knowledge and eventually contributed to the development of many new DuPont products. Among the fundamental research projects undertaken by the DuPont Company back in 1927 was the work on condensation polymers. This work has since borne fruit by forming the scientific basis which led to such products as nylon, "Zytel" nylon resin, "Delrin" acetal resin, "Mylar" polyester film, and "Cronar" polyester film base. The long list of other products stemming from our basic research projects includes neoprene synthetic rubber, weed killers, and polyurethanes.

A pioneer

DuPont has been one of the industrial pioneers in basic research. Back in 1927, virtually all industrial research was "practical," aiming directly at product discovery and development. Then came, in addition, the quest for more pure scientific knowledge.

DuPont's belief in the importance of this work has caused basic research to become an immense, never-ending project for the company. Today, approximately 440 DuPont scientists are engaged in this type of activity and, altogether, 2,170 are working exclusively on research and development projects.

Fundamental combustion research

The Petroleum Chemicals Division participates in this program through such research as our continuing fundamental combustion studies at the DuPont Petroleum Laboratory. The results are made available to the petroleum industry in published papers.

One of our newer products, Fuel Oil Additive No. 2, is an outgrowth of polymer research conducted in the main DuPont Experimental Station.

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

DU PONT *Petroleum Chemicals* NEWS

CONTINUED *Additives Handling*

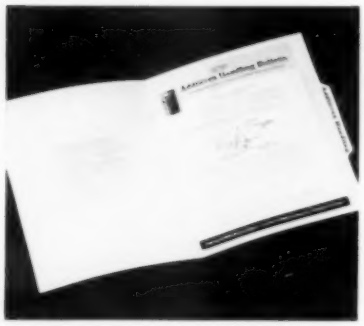
The first of these has recently come off the press. It deals with the use of duplex pumps (instead of the simplex type) for keeping additives free-flowing in cold weather.

By using this type of pump, installed with the additives drum in a heated building or cabinet, the additive, with diluent, can be piped for a considerable distance outdoors in cold weather. Thus the necessity of either heating or insulating pipes is avoided.

A diagram shows clearly how the pump can be set up in a typical refinery treating system. Information on installation, applications, variations, advantages, and costs is included in the bulletin.

Future subjects

Other bulletins in the series which will be published shortly will discuss such subjects as methods of pumping, heating, dispensing, storage.



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See the "Du Pont Show of the Month" on CBS

HEADS UP EASTERN REGION

EARL G. BENNETT is Eastern Regional Manager for the Du Pont Petroleum Chemicals Division, with headquarters in New York City. Prior to this assignment, he was Central Regional Manager in Chicago.

Mr. Bennett has been with the Du Pont Company since 1931. His first job was in the Grasselli Chemicals Department. In 1934 he was transferred to a sales position in the Organic Chemicals Department.

In 1939 he went to Chicago in charge of sales in the Western area for the organization now known as the Petroleum Chemicals Division. He returned to Wilmington in 1943 as a member of our Petroleum Laboratory staff. He was appointed Central Regional Manager in 1947.

Mr. Bennett was graduated from Clarkson College of Technology with a B.S. degree in chemical engineering. He is a member of the American Chemical Society, the Society of Automotive Engineers, and the American Petroleum Institute.

When he recently took over the managership for the Eastern Region, he succeeded Mr. Alfred R. Mullis, who became assistant director of sales in Du Pont's home office, Wilmington. And Mr. Bennett was succeeded in the Central region managership by Mr. Donald W. Frison, formerly manager for Mid-Continent region in Tulsa.

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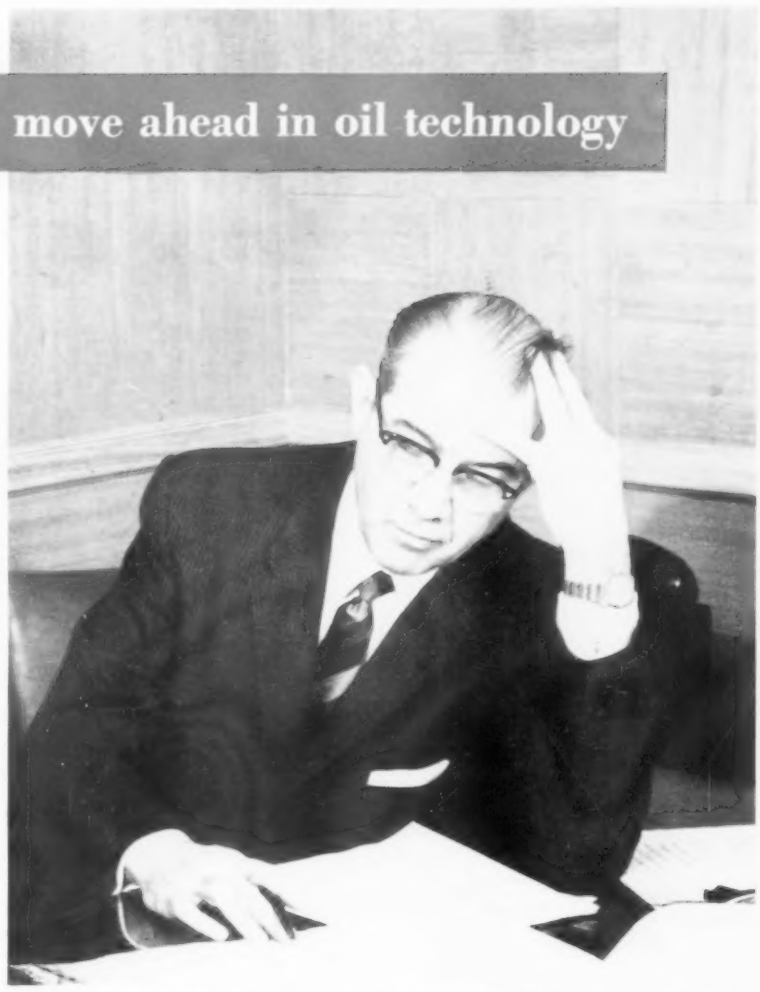
Problem: How to move ahead in oil technology

Solution:
Gear up management to faster pace



W. PAUL COURTNEY, general manager of Cardwell Manufacturing Co. Despite the decline in oil field activity, his management team boosted company sales 50% last year.

The pressing demand for new and better oil-field technology is testing the reactions of many an equipment supplier. Among those shifting successfully to higher gear is the management of Cardwell Mfg. Co., Wichita, Kans.

The name, Cardwell, has long been a familiar one on drilling rigs and workover units in the oil country. Until the company was bought in 1956 by the John W. Mecom interests, of Houston, it was run by H. W. Cardwell, Sr., as an owner-manager type of operation.

But when Mecom entered the picture, a professional "management team" took over. Today, as Cardwell emerges from its transition period, the effect of the new leadership is showing up on the company's books.

In 1957, despite the slackening of the industry's drilling effort, Cardwell's sales jumped 50% over the 1956 total. The company is confident it will make a similar gain this year.

Calling the shots for Cardwell's expansion is W. Paul Courtney, the general manager. He has behind him a string of successes in 20 years of sales management with various oil equipment manufacturers. He spends much of his time at Cardwell's Houston office, where he can watch both export and domestic business.

Company officers are convinced that, under today's business conditions, clear goals are more vital than ever before. "You've got to know what you're shooting at," says Courtney. "And it's essential to keep looking ahead—as far ahead of the competition as possible."

Adds Courtney's right-hand man, Wichita plant manager K. W. Patterson: "In an operation such as this, the primary requisite is for us to decide what kind of business we are actually in. We need to know what we should or shouldn't make."

To rule out guesswork, Cardwell ran a complete check of the market situation in oil field equipment.

Cardwell feels that the rate of technological improvement will make things tough for anyone who is bound by "conventional" methods. The company now starts its designs with "a blank piece of paper."

"This oil equipment business," explains Courtney, "is a changing business. The way wells are drilled today is quite different from the way they were drilled only five years ago. We feel a company can grow rapidly only by designing new types of cheaper and more effective equipment."

J. T. Tucker, Cardwell's general manager of sales, calls the company's new lightweight V-1500 slush pump (PW—Sept.27'57,p30) a good illustration of the "blank paper" policy.

"We threw everything on slush-pump design out the door. We knew this pump had to come first, because we felt it was the one thing that drilling needed badly—and fast. And in a way, we went about it backwards. Usually a manufacturer starts with the smallest unit and works up to the big stuff. But we went the other way around, because we knew that the deep drilling of today requires a high-volume, low-pressure pump—readily convertible to a low-volume, high-pressure pump."

Adds Tucker, "We're convinced the trend will be toward complete portability of drilling equipment. Smaller-sized pumps of the V-type, with their light weight, should be a boon to the contractor with smaller rigs."

The introduction of a line of small-

How to find Quality

and Service In Mud Pumps

Precision and skill of a proven manufacturer combined with the talents and know-how of a leading supply organization add up to two words . . . unexcelled service. That's the service assured by the appointment of Jones & Laughlin Supply Division as a distributor of Gardner-Denver mud pumps.

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er pumps patterned after the V-1500 is part of Cardwell's plans to expand its full line. Coming soon are several new truck-mounted drilling rigs and workover units.

To provide an organization structure that will meet new demands for creativity and decision-making, Cardwell has clearly staked the areas of authority. John Mecom retains overall control. Although he has no day-to-day role in company management, he does get control charts each month. These he can scan quickly for weak and strong points.

It is Courtney's job to make the big operating decisions, and to channel the flow of authority through the company. "Each department head," Courtney says, "is 'billed' for a project. He is responsible for seeing that the work is done, and done right. It's an axiom in well-run organizations that you cannot delegate responsibility alone. You also have to delegate the authority to do the job. And we don't violate that authority."

To provide coordination, Courtney holds an executive committee meeting in Wichita once a month. He himself is committee chairman, with plant manager Patterson the vice-chairman. Tucker is there to represent sales. Other committee members are F. L. Bockenheuser, the controller; and G. G. Brown, the director of engineering.

To see that all 475 employees are kept tuned in, management insists on a lot of face-to-face contact. Cardwell supervisors are regularly briefed on the company's inventory situation, turnover ratios, sales targets, and profit margins on different products. "You might say," explains Courtney, "that this outfit is very emphatic about getting the right information to the right people at the right time."

The company steers clear of what it calls "gimmicks in developing people." Courtney expresses his philosophy this way: "Management is only here by the tacit consent of employees, as well as of the customers, the public, and the owners. You don't buy and sell employees. You only expose them to opportunity.

"We don't believe in manipulation. But if an employee elects to try to improve himself, we give him all the training help we can, and let him progress on his own merits."

Plant operations are on a streamlined basis. To see that jobs get done on time, the company uses the "countdown" method—a variation of the one used in firing missiles.

"Basically," says Patterson, "this means setting up a strict project schedule."

All ideas for new equipment are first fed to Cardwell's research and development departments, in Wichita. The ideas are then reviewed by the executive committee. If an item is given the green light, it is put on a timetable.

"Each department," says Patterson, "must have its drawings, plans, or other work done by a specific time. And we count time by weeks, not months.

"If a gear-train arrangement is to be completed, say, 15 weeks from the start of the project, we set it up as X minus 15. As the weeks roll by, each separate function is completed. When the 15th week comes around, the gear-train arrangement drops into place, like a piece of a big jigsaw puzzle."

In addition, Cardwell has mechanized its paperwork, with a punched-card data-processing system. This can be used to predict the workload for any given week.

"With it," Courtney sums up, "we don't have to guess what will happen. We set up a target, and make it happen."

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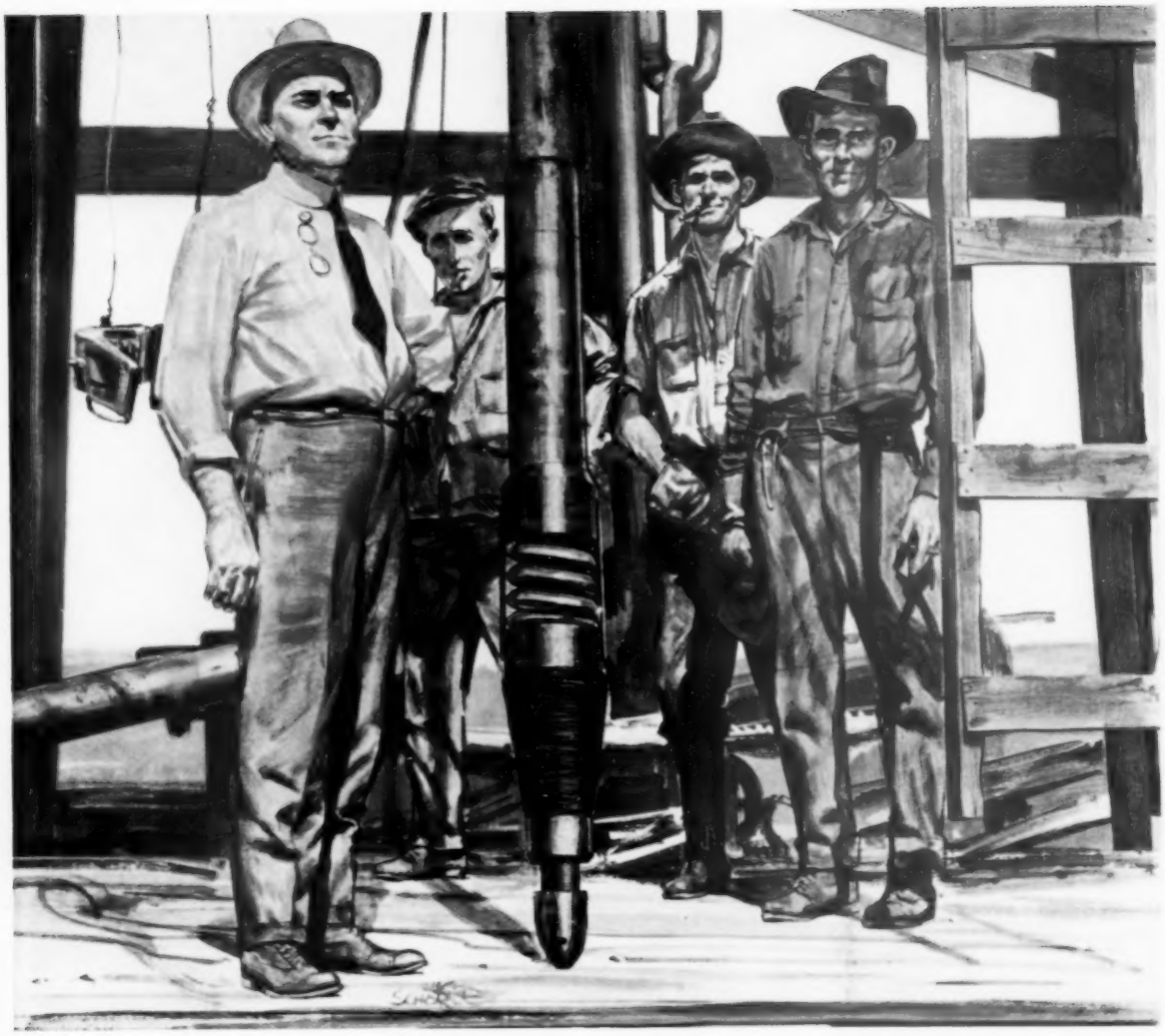

JUST OVER THIRTY YEARS AGO El Dorado, Arkansas was booming. In progress was a drilling program, the size of which had seldom been seen until that time. More than an oil discovery was made at El Dorado for it was during that boom that the first Johnston Drill Stem Test was run. Since then, more than thirty years ago, over half a million drill stem tests have been run by Johnston personnel and with Johnston equipment.

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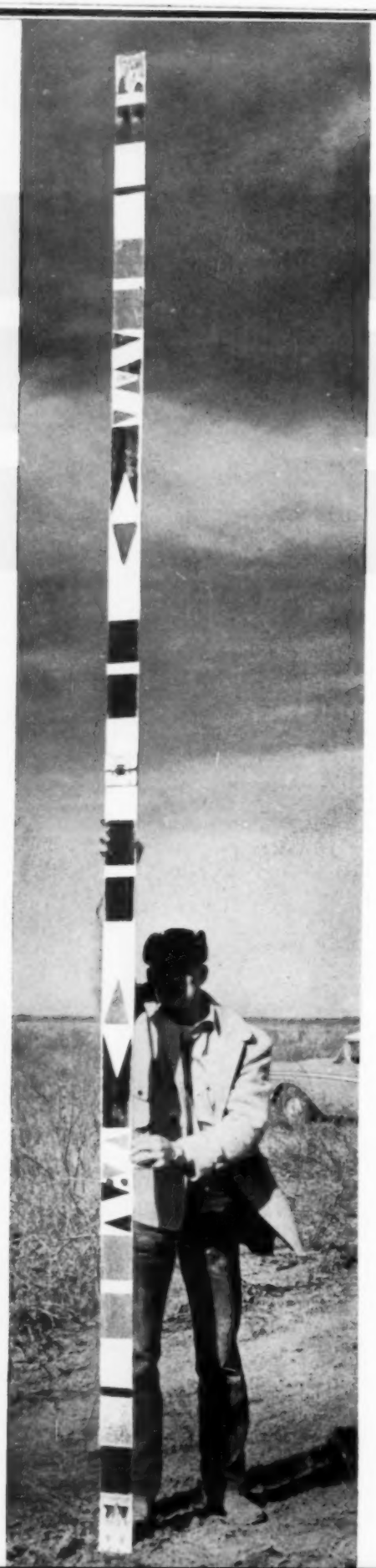
PETROLEUM WEEK / SPECIAL REPORT

Exploration

The Challenges Are Many...

Story Starts on Next Page



In Exploration: The

- **Most "easy" oil has been found. It's the remaining 450-billion bbl. or so that'll be tough.**

- **The industry has been chipping at the obstacles. Now it'll have to blast.**

If the oil-finding rate in the U.S. and abroad is to increase significantly, radically new exploration techniques will have to be developed. But unfortunately, no such bold new methods now appear on the horizon.

That's the opinion of leading geologists and geophysicists. PETROLEUM WEEK interviewed them just as they were preparing to leave for the joint annual meeting of the American Assn. of Petroleum Geologists, and the Society of Economic Paleontologists & Mineralogists starting in Los Angeles this week.

The threat of dwindling oil reserves, which are becoming increasingly harder and more expensive to replenish, hangs over the heads of all oil finders. Some predict that improvements in existing tools and techniques will help—but not nearly enough to check the declining discovery rate.

The threat of dwindling reserves has spurred new efforts on the research front among all oil-finders—geologists, stratigraphers, geophysicists, seismologists, paleontologists, geochemists, and other specialized exploration scientists.

Their goal: to locate, surely and economically, the 450-billion bbl. of oil which, according to the estimates of a leading geophysicist, are yet to be found throughout the world. In fact, there is speculation that with radically improved techniques, the volume yet to be found may be even greater than now believed.

One of the major, specific problems facing oil-hunters: to find an easier, more definitive method for determining the location of a buried stratigraphic trap.

Most geologists and geophysicists contacted agree that the stratigraphic trap may hold the key to adding substantially to the known petroleum reserves of the United States, and other countries as well.

"Most of the really big structures have already been mapped," says a leading geophysicist. "We've got to locate the stratigraphic traps quicker and in greater numbers if we hope to increase our oil reserves."

SPECIAL REPORT **Exploration**

Pace Must Be Quickened—Fast!

Some argument exists even among geophysicists as to whether stratigraphic traps can be located accurately by using present-day techniques.

"We feel we are improving our batting average in locating these traps with seismic data," says a geophysicist for a seismograph-equipment manufacturer.

"A good geophysicist can many times locate a buried stratigraphic trap by dead reckoning and proper evaluation of geological and geophysical data," says another geophysicist.

Another big goal: to find better ways to interpret geophysical data that's currently obtainable with existing geophysical equipment and logging tools.

This holds true no matter what type of structure, or anomaly, is being sought.

"We can get practically all of the basic information we need now for proper interpretation," says a geophysicist. "But our problem is this: We still don't know fully just what to do with it to arrive at the best possible conclusion.

"Here, I believe, lies one of our biggest problems in the exploration business today—how to get the right picture of what actually lies below the surface."

Another problem: How can closer cooperation be developed among all the various types of oil finders? Some progress has been made, but more must be done.

Broadly speaking, the field of petroleum exploration falls into the general classification of "geology" and "geophysics." There may be several different categories within each classification, with considerable differences among them.

But, as experience has shown in the past, cooperation of all the specialized oil finders must be had in order to obtain the new petroleum reserves so badly needed to meet future demand.

The signs already point toward much closer relationships between the geologist and the geophysicist. These oil hunters are beginning to bury old differences as they unite their efforts for the common goal.

Says one geologist: "We geologists can locate the structures from our surface observations alone, usually. We don't actually need the geophysicist's help. On the other hand, the geophysicist can locate them without our help too, simply by using his seismic equipment, and without surface observation.

"But we now feel that it takes both of us, working together, to find those strat traps. We have to put all of our know-how into the pot in an effort to solve the riddle of the strat trap, and I believe that geologists and geophysicists, generally, will agree with me.

"All the experimentation and research now going on is pointed toward the goal of bringing geophysical and geological information closer in line, to get a truer picture, and to find oil better.

"So, more and more attention is being paid to interrelating all data from all sources."

Nothing Revolutionary in Sight

Petroleum Week's survey of exploration brought out one point very quickly: Right now, there is no really revolutionary new exploration equipment or technique in sight. But many improvements are in the works.

There may be some new ideas or approaches in the thinking stage, which may have considerable impact on the oil-finding business perhaps five or ten years from now—if they pan out.

But, so far as the near term is concerned, geologists and geophysicists seem generally agreed that the outlook for anything really new is dim, indeed.

"There is no 'fancy dandy' just around the corner that is actually going to locate oil or gas for us, unless we drill for it," a geophysicist for an equipment-manufacturing firm says. "Like gold, oil is still where you find it. While we have tools and techniques that help us find the structures and formations that may hold oil or gas, the only way to be sure, still, is to drill holes in the ground."

Says the chief geophysicist for a large oil and gas company in the Mid-Continent region:

"There's a lull right now in geophysical activity in the United States. During this lull, we geophysicists are trying hard to come up with better interpretative methods, and to refine our existing exploration techniques to do a better job.

"It's a difficult task, but one of these days, perhaps, we'll hit on something really significant."

The continuing research into more precise and accurate interpretation of geophysical data seems to offer the best route for oil hunters in the near future.

"Better interpretation will undoubtedly open the door to easier location of prospective oil wells—but it will take time," says a geologist.

"In this exploration game," a geophysicist adds, "you don't find any cure-all for your ills overnight. This is such a highly complex operation that we require years and years of intensive, exhaustive research in order to come up with even the most simple, practical interpretative approach."

The approach to research by the exploration branch of the industry is changing, too. In past years, researchers based their efforts on experience or observation. Now the trend is toward experimentation on a planned basis, with controlled data.

A leading Texas geophysicist puts it this way: "In years

continued ▸

WALL-SIZE COMPOSITE of aerial photos—a growing exploration tool—shows the entire Waggoner Ranch, North Texas.

past, research was based on the empirical approach. Now it is being based on the objective approach."

Although this geophysicist says there has been nothing "really big" since development of magnetic recordings, he does look forward to "more effective use of magnetic recordings and data processing" to find oil.

"It would be desirable to have data in true subsurface position, which requires migration techniques of one kind or another," he adds.

There already is a distinct upsurge in refraction shooting, says one geophysicist. This is due, he adds, to: (1) significant improvements in instrumentation; and (2) application of brand-new theoretical concepts evolved through mathematical analysis and laboratory-model studies.

"Through theoretical studies, what should be seen can be predicted, and field tests can then substantiate your laboratory findings," he says.

Refraction work is especially useful in foreign areas, where there is very little known geophysical information.

Further research—including more study of sediments—should contribute to better interpretation of geological data.

Research in all categories is slowly but surely bringing geological exploration into a more important position.

"Geologists will give more stress in the future to better correlation of subsurface data and to studies of sediments," says one geologist.

The geologist is paying increasing attention to downhole findings, by use of improved logging techniques. No longer does the geologist simply take a pick-axe, ride a horse, or walk over the land looking for dips, strikes, and various rock formations. He still does this, of course, but he does a lot more. Geological research is now an exacting science.

The most important advance in geophysics—apart from magnetic recording on tape of the geophysical data itself—is the trend toward establishment of the data-processing center.

Today in most areas, any "customer" can send his geophysical records—usually on magnetic tape—to the center for classification and interpretation. The customer is charged a fee for this service, getting in return top-notch geophysical interpretation.

There are several data-processing centers in the U.S., and one is now operating in Calgary, Alta. In addition, several of the major oil operators maintain their own centers. But because of the high costs involved in obtaining the necessary geophysical "play-back" equipment, these installations are limited.

"It would be impossible," says a geophysical-equipment manufacturer, "for the average oil operator to be able to evaluate his own geological and geophysical data with the thoroughness he can obtain through a data-processing center. Therefore, we see an increased use of such facilities over the country in the future."

Several notable advances in logging techniques and interpretation have also evolved in the field of geophysics in recent years.

These logging devices are designed to give the geologist and geophysicist a better evaluation and correlation tool. Much research will be concentrated in this field.

In the field of paleontology—a highly specialized section of the geological operation—work will continue on the study of fossils, particularly of foraminifera, pollen, and spores in micro-micro fossils.

The paleontologist today, as in the past, devotes the biggest portion of his time to pure research. This is such a narrow field that years are required to establish "libraries" of usable information.

But paleontology is filling an important role in the oil-finding picture. Most important present contributions are in the offshore hunt in the Gulf of Mexico, where long-range correlations are next to impossible without the aid of fossil study.

New thinking in recent years has brought about several different approaches. Most notable has been the study, dating back some seven or eight years, into the aspects of plant spores and pollen in micro-micro fossils.

The field of geochemistry is concentrating on the dating of rock ages by chemical means.

Such studies are important in helping geologists and geophysicists understand more fully the formation of source rocks and the pattern of oil migration.

continued ▸

Vertol 44 solves transport problem for oil industry

The petroleum industry has a new tool, the Vertol 44 helicopter, to cut manhours, money and misery out of exploratory drilling at remote sites.

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The geochemist—a specialized geologist with a chemical background, or vice-versa—is carrying out important, long-range research into how source rocks form.

By using various chemicals and radioactive materials to determine the precise geologic age of various samples, geochemistry will offer an important correlation tool.

Important: Magnetic Recording

Magnetic recording has been hailed by many geologists and geophysicists as the "most important contribution" in the exploration field in the past 30 years—though there are some who disagree with this view.

Magnetic recording of geophysical data is continually being refined and improved. This method enables the geophysicist to obtain his seismic record on tape, rather than by use of photographic-paper methods.

With magnetic tape, the oil-hunter can play his record as often as he wishes, emphasizing certain recorded traces and de-emphasizing others. He is able to eliminate much of the "noise" (all recorded energy not derived from the explosion of the shot), and the extraneous seismic waves that show up on conventional paper records. Thus, he can concentrate on those data he actually needs for his analysis and interpretation.

Magnetic recordings are interpreted by the use of various filtering elements, and these are constantly being subjected to refinement and improvement by the geophysical-equipment manufacturers.

The recording technique is very important because, with magnetic recording, once an area has been "shot" on tape, it can be "reshot" over and over again in the laboratory, by playback. This eliminates the need to send the equipment back to the field in cases where certain data were not obtained by conventional recording on paper.

There is one drawback, however, to the use of magnetic recordings: The intricate equipment is very expensive to buy and to maintain, and the cost of shooting operations is higher than with conventional photographic-paper methods.

The delicate nature of the instruments also makes them more susceptible to field damage.

"Magnetic recording," says one geophysicist, "is a good tool to help us get better records. From these magnetically-recorded data we can obtain more comprehensive and usable information. The technique has opened up a whole new area of possibilities to the geophysicist."

Concurrently, there has been improvement in the use of shot patterns for obtaining geophysical data by means of field seismology.

Multiple-hole shooting gives better data in many areas of poor reflection quality. This information is more easily interpreted.

Research by the seismograph-manufacturing firms will continue on geophones (electric-impulse pickups), rectifiers, filters, amplifiers, and other seismic recording and playback equipment.

There also has been an increasing use of aeromagnetics. This includes use of the airborne magnetometer over vast, desolate areas. Use of aerial photography, too, has increased.

HELICOPTERS speed the search for oil in the Louisiana swamps by lifting seismic crews and equipment from place to place.

Donald M. Davidson, of E. J. Longyear Co., told the recent annual meeting in New York of the American Institute of Mining, Metallurgical & Petroleum Engineers, that "the advancement in aerial geophysics since the war has been one of the most heartening phenomena in geological exploration."

He added: "In appraising the over-all cost of photogrammetry and photogeology for a large area, the total sum involved may seem large in terms of exploration work done before the last war. Nevertheless, one must consider the speed of appraisal. Aerial photography provides base maps in a mere fraction of the time required by the old methods. Photogeology provides a coverage of wide areas many times faster than reconnaisance ground surveys can.

"Ground surveys are still vital to the appraisal of any new area. This type of survey must be fitted in with the others to get the most from all elements in an appraisal."

And as for costs of aerial geophysics, Davidson said: "Aerial magnetometer work for petroleum exploration costs from $6 to $9 per line mile . . . Costs of electromagnetic surveys vary from $10 to $17 per mile, depending on length of the flight line. For an all-out survey, including magnetometer, electromagnetic work, and scintillation counters all combined in one fixed-wing aircraft survey, the costs vary from $14 to $25 per line mile."

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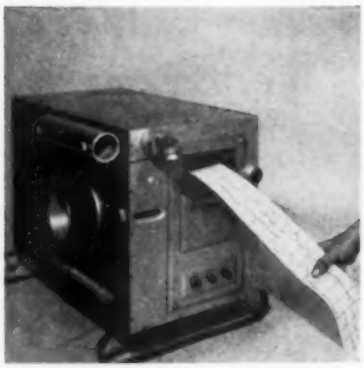

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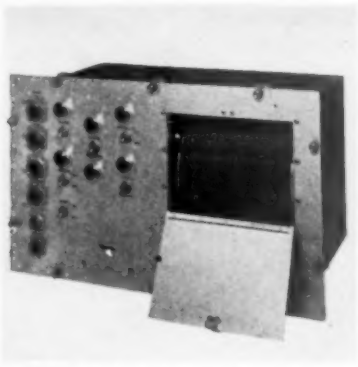

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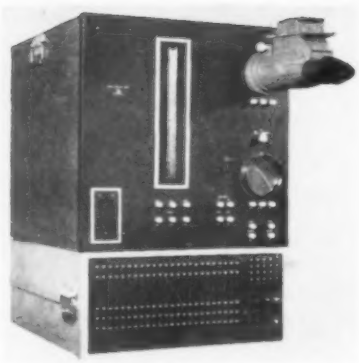

VARIABLE INTENSITY PLOTTER compresses seismic data into sections.

One geophysicist says that "aeromagnetic work could aid in the search for oil in areas like Alaska. Magnetometers give a rough picture of the basement. They tell you where some of the faults are, where the lava lies, and where the igneous plugs are."

The technique of using ultra-high-frequency sound waves in exploration tools will be important in the future, too.

The "Sonoprobe," developed by Magnolia Petroleum Co., is an example of a tool using this technique. But more research is being done in the adaptation of high-frequency sound waves to determine subsurface conditions.

There have been many developments in electrical prospecting. But further advances are in the works.

The French have made considerable progress in the field of telluric (natural earth) current.

"You can get current into the earth easily enough," says a geophysicist. "The technique has promise. But the hitch is: How are returns to the surface to be evaluated?"

Research is under way on seismic methods using continuous seismic waves, in contrast to the impulse sources now used.

H. F. Dunlap and Curtis H. Johnson, speaking at a recent meeting of the Society of Exploration Geophysicists, said that research is now being carried out on techniques based on use of frequency-modulated, continuously-excited seismic waves.

"In practice," the authors said, "an electrical or mechanical vibrator is used to excite the ground seismically, at a slowly varying frequency. This wave suffers reflections and refractions, which arrive at remote seismometer locations delayed in phase. Output of a seismometer located at the source is correlated with the output of these remotely located detectors.

"Final conclusions about the usefulness of the method cannot be reached yet. Interference due to surface waves from the source is one serious problem which must be overcome."

Nuclear logging continues to receive heavy attention from researchers.

An American Petroleum Institute subcommitte is presently studying all phases of nuclear logging. And only last month, the University of Houston began setting up a new radiation-logging "campus" to seek a method for standardizing radiation-logging tools (PW—Feb.7'58,p21).

In the field of chemical logging, use of more sensitive and reliable instruments will make this method increasingly effective.

Use of the infra-red absorption analyzer and the mass spectrometer, in lieu of the hot-wire filament that has been standard for so long, has been a notable advance, according to many geophysicists.

Another possibility is the use of gas chromatrography as a means of analyzing the various hydrocarbon constituents broken out of the mud stream. A recent development along this line is a new technique for analyzing gas samples, called the "Gas Chronofrac." Developed by Hycalog, Inc., the technique has, according to the company, "a sensitivity many times greater than conventional gas detectors."

The method involves chronological fractionation of samples taken at measured intervals directly from the flow line.

"Immediate on-location logs are available, within two minutes after a sample is introduced into the unit. This information is later incorporated into the complete logging report on the well," says a company spokesman.

New Seismic Tools Appear

In the field of seismic developments, several new instruments for exploration and interpretation have appeared on the market in recent years.

Many of these new tools reflect advances in electronics and atomic energy. And though these instruments are not used specifically for locating hidden oil deposits, they enable oil hunters to make better use of existing instruments, either in operation or in final interpretation.

The Seisverter, for instance, enables researchers to transfer seismic records from conventional photographic paper direct to magnetic tape.

At the same time a variable-density record can be made

continued

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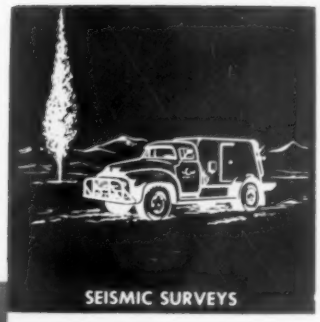

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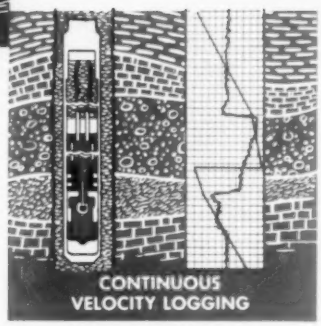

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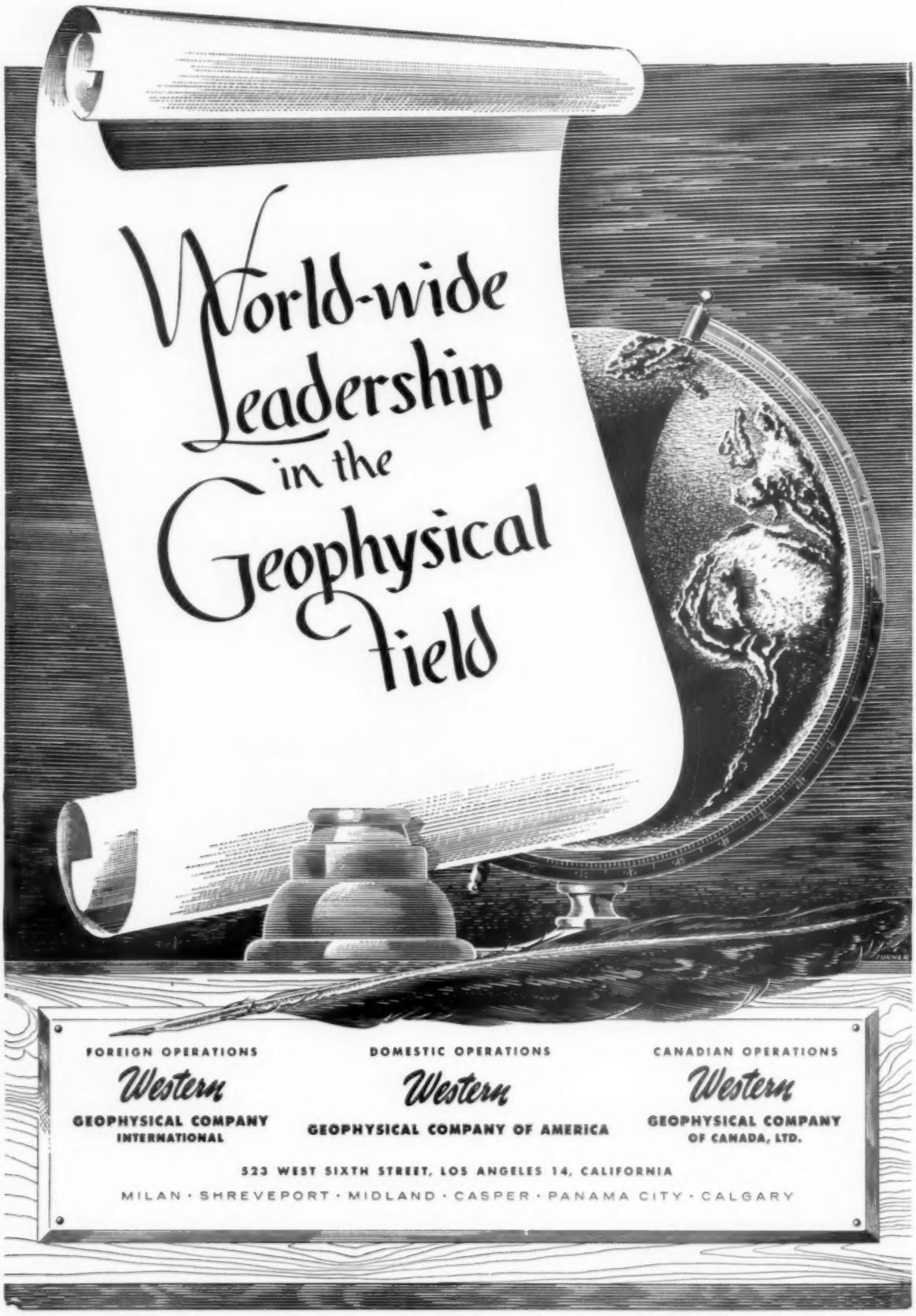

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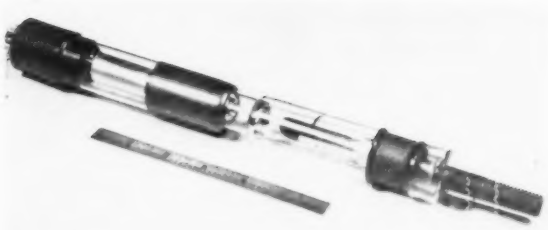
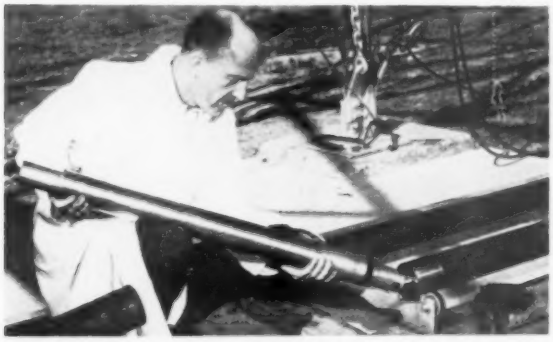


SEALED DISCHARGE TUBE, developed by Schlumberger Well Surveying Corp., is a high-intensity neutron source for logging.



MINIATURE ATOM-SMASHER, developed by Well Surveys, Inc., is another type of neutron generator used in logging.

ATOMIC "SEVENTH SENSE" logging tool developed by California Research Corp. is lowered into cement test blocks.

for further evaluation (PW—Nov.15'57,p33). The Seisverter was developed by Seismograph Service Corp.

There are only about a half dozen or so of these machines in use today, all by SSC or its subsidiaries. The company hopes, however, that the Seisverters will soon be available in sufficient numbers for leasing to interested companies.

The CRC Section Plotter is designed to operate in a seismic "central playback" office, plotting sections from data recorded on magnetic tapes.

The instrument, developed by California Research Corp. and licensed to Texas Instruments, has a paper capacity of 150 ft., up to 42 in. wide. It records 24 traces during each revolution of a disc, or tape.

The plotter can be adjusted to record conventional traces, variable intensity traces, and variable area traces, either in time or in depth.

The Seisyn Computer, an analog computer, synthesizes reflection seismograms from basic well-log data.

Developed by United Geophysical Corp., the instrument is capable of plotting a strip graph from continuous velocity logs. The company says that the principal features of actual field seismograms, exclusive of seismic "noise," can be predicted with fair precision.

In cases where reflection events observed on the actual record are not indicated on the synthetic record, the lack of agreement may in itself be significant.

The Variable Intensity Plotter provides a rapid means of compressing a mass of corrected seismic data into section form, while preserving the relative character of the recorded events.

Big advantage of the VIP, which was developed by Texas Instruments: Its cross-section closely approaches a geologic section, and is therefore readily comprehended by nongeophysical personnel.

Among other advantages of the VIP, says the company, are direct operation from magnetic recording, with no intermediate records necessary; use with all magnetic transducers; and greater speed and reliability because of the completely electronic system.

The Seismic Profile Printer climaxed a 20-year research effort to "see underground" by means of the seismograph.

The profile printer, developed by Gulf Research & Development Co., adds to the speed with which prospective data can be utilized (PW—Mar.15'57,p24). It also frees skilled manpower from the time-consuming work required to interpret former types of seismic recording.

The recording system takes seismic sound waves and translates them photographically into compact cross-section pictures of the subsurface. Result: a detailed, accurate picture of domes, faults, and other structural features. The likeness of the photographs to geologic drawings of known cross-sections is said to be "striking."

The Electrofax process offers a nonphotographic means of recording and reproducing seismic information.

Milton B. Dobrin and Henry F. Dunlap, of Atlantic

continued ▸

Refining Co., reported on this Radio Corporation of America development at a recent SEG meeting.

"The photo-conductive paper employed," they said, "is given an electrical charge, then exposed to light. When the image falls on the paper, the electrical charge is dissipated, forming a latent image. A fine powder, which is both opaque and electrically charged, is then dusted over the paper, making the latent image visible."

The image is fixed by a heat process. No chemicals are used.

In a slightly different process, using Western Union's "Teledeltos" paper, a white layer covering a dark surface is removed by application of an electric current through a stylus.

Dobrin and Dunlap added, "These methods have the great advantage of simplicity and freedom from darkroom procedures in the field."

Along with development of new instruments, seismic exploration is being aided in another, indirect manner: Components are being made smaller, and more compact, to improve portability.

Many seismic instruments have been designed to "break down" into packages easily carried by one man. This trend will continue as the search for oil goes on in even more remote, hard-to-get-at areas of the world.

General Geophysical Co. has just come out with a portable magnetic-tape recorder for geophysical seismic work. The unit—known as the Geocord—features complete transistorization and light weight.

The field unit produces standard 24-channel magnetic records, despite its compactness and light weight (the complete recording system is contained in two cases, each weighing 145 lb.). The Geocord is hermetically sealed to prevent atmospheric corrosion, and to keep it water- and dust-free.

Western Geophysical Co. recently unveiled a new "backpack" seismic outfit (PW—Feb.7'58,p24). This unit can be used in areas where motorized equipment can't get through. The units can be broken down into 7 to 11 loads, each weighing from 40 to 54 lb.

Logging Tools Are Improved

The hunt for oil reserves has also been aided by various logging developments. One such is a new sonic tool, which logs the velocity of sound waves in the formations immediately surrounding the borehole.

The device was introduced commercially late in 1957 by Schlumberger Well Surveying Corp. It is based on a development by Humble Oil & Refining Co.

The method is expected to be especially helpful in gaining porosity information in the lower ranges, since, in a given rock type, changes in porosity have a controlling influence on the velocity of sound propagation.

The method is said to have several advantages over porosity determination by neutron logging. These include greater detail, faster logging speed, lack of statistical variation, and independence of hole diameter and type of mud.

The Rotologger, still under development, will make possible the gathering of potential and resisity curves from a fresh, uncontaminated formation, according to reports.

The Rotologger, which has been under development by Lane Wells Co., one of the Dresser Industries, has been turned over to Well Surveys, Inc., for further development.

Using the Rotologger, says one engineer, "you can tell if you are in fresh water, or in an oil sand. And if it quits working, you don't have to come out of the hole. You can wait until you're making a trip to change it."

One disadvantage, however, is said to be that the results which are transmitted to the surface are not subject to clear interpretation. "It is necessary to become educated to what it is telling us," says another engineer.

A new version of the portable Geo-Logger—designed for low-cost electric and gamma-ray logging on seismic and shallow core holes—has been put on the market.

The logger, developed by Well Reconnaissance, Inc., is completely portable, and will fit into the trunk of a car. It employs an automatic, instantaneous process for developing dry photographic records.

Although seismic equipment and logging devices get the lion's share of research, a good deal of effort is being made to gain better interpretation of gravity data.

Hycon Eastern, Inc., recently introduced a device that will furnish an absolute measurement of the effective value of the earth's gravitational field.

The apparatus is to be mounted on shipboard. It will be able to measure the gravitational field at a high repetition rate, in the order of two or three times per second.

This equipment may also be adapted for aero-exploration.

The company says that, while the "Absolute Gravitometer" was designed for vehicular and shipboard application, it is adaptable to aerial use by the petroleum industry. It may be necessary, however, to redesign the electrical circuitry associated with the instrument so that only solid-state components can be used.

The existing prototype of the gravitometer is bulky, weighing some 500 lb. when all components are included. But, says the company, weight and size can be reduced.

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Reprints of this report are being prepared, and will be available in April. Single copies will be sent to PETROLEUM WEEK subscribers on request without charge. Additional copies will be billed at the following rates: 1-10 copies, 50¢ each; 11-100, 40¢ each; 101-1,000, 30¢ each; over 1,000, 20¢ each. Address orders to:

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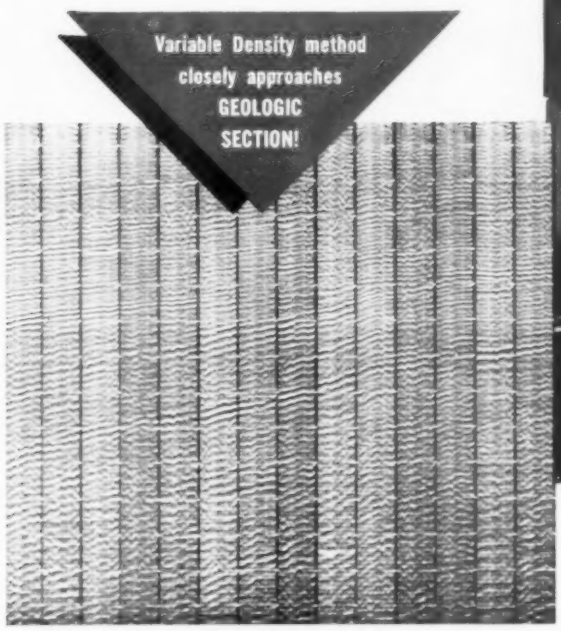

The VARIABLE INTENSITY PLOTTER developed by Texas Instruments rapidly corrects for time or depth and compresses a mass of seismic data into section form, while preserving the relative character and contrast of recorded events. The VIP cross section closely approaches a geologic section, and is therefore readily comprehended by non-geophysical personnel.

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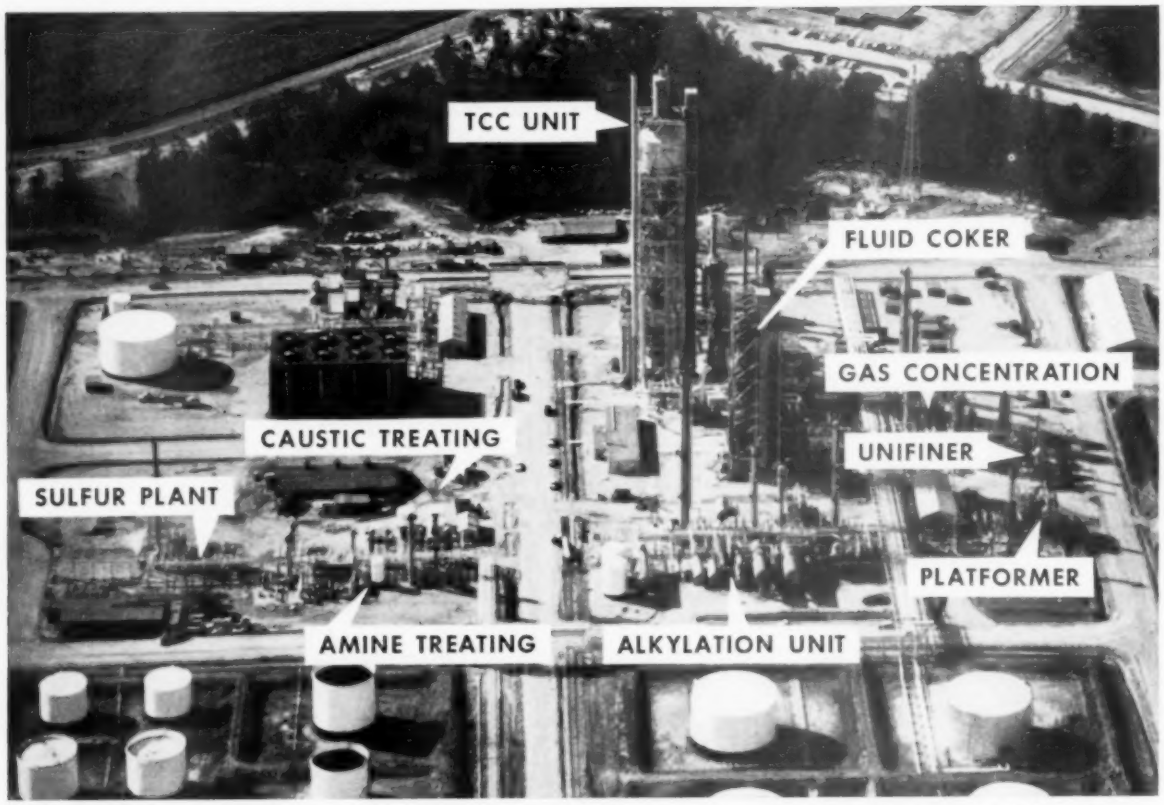

NOVEL REFINERY for Pontiac Eastern Corp. at Black Creek (Miss.) has no crude still. With viscous crude feed, this . . .

'Gasoline Factory' Yields 85% Gasoline

"Gasoline factory" is the description for Pontiac Eastern Corp.'s unconventional refinery, which successfully processes "impossible" south Mississippi crudes.

Pontiac's Black Creek refinery, located 12 mi. from Hattiesburg, Miss., required one year to "conceive," three years to engineer and build, and $20-million to finance.

Gulf Oil Corp., large producer of low-grade, viscous, 16-gravity crude from south Mississippi fields, furnishes crude feed to the Black Creek refinery. Gulf also supports the refinery by marketing Pontiac Eastern's products through Gulf retail outlets in Mississippi and other southeastern states.

These low-grade crudes have been a headache for Gulf since 1947, when they were first produced in quantities large enough to support a refinery. Their sale was limited to the fuel oil and asphalt markets.

Starting in 1953, Pontiac Refining Corp. (parent of Pontiac Eastern) spent one year in research, analysis, and pilot-plant studies to develop the refining scheme now in use at the Black Creek refinery.

Engineering and construction was begun in 1954 by Fluor Corp., Ltd. The refinery was completed late in 1957, and full commercial operation was reached early this year.

CONTROL OF PONTIAC'S REFINERY is centered in a 108-foot-long graphic panel.

There are two major parallel flow patterns in the refinery—a crude oil stream and a field distillate stream.

Feed to the refinery consists of 11,000 b/d of the heavy crude and 3,500 b/d of field distillate.

Processing units for the crude are essentially separate from those used to process the field distillate (see flow diagram, page 62).

Novel aspect of the crude process-

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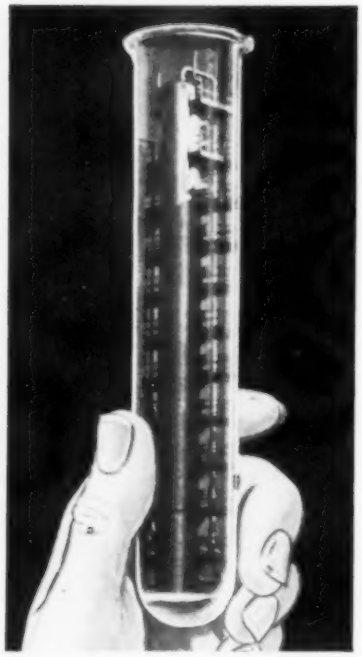

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ing is the absence of a crude still. The crude is separated into two cuts by a flash tar separator.

Light overhead material from the tar separator is feedstock for the TCC (Thermofor Catalytic Cracking) unit, while the heavy bottoms go to the Fluid Coker.

There is a maximum production of gasoline, a minimum of heavy fuel oil, and 200 tons a day of fluid coke.

The field distillate is first fractionated into four process streams.

Straight run gasoline from the fractionator is sent to gasoline blending. Straight run naphtha becomes feedstock for the Platformer, and the kerosine is either a final product or blended into diesel fuel.

Bottoms from the fractionator are added to the crude stream entering the tar separator.

Light cycle oil from the TCC unit is charged to the Unifiner for desulfurization.

Hydrogen for the Unifiner operation comes from the field-distillate Platformer. Desulfurized effluent from the Unifiner is fractionated into a gasoline and a diesel fuel.

Feed for the sulfuric acid alkylation unit comes from the TCC unit overhead product.

Propylene and isobutane from the TCC unit are recovered in the gas concentrator, treated to remove sulfur, then sent to the alkylation unit.

The treating area includes amine and caustic treating units to clean up process streams and products.

Hydrogen sulfide, including that from the Unifiner, is recovered from amine solution and burned in a sulfur furnace to make elemental sulfur.

The gas concentration unit separates and concentrates various liquid and gas hydrocarbon streams from the process units.

TCC overhead product is separated in the gas unit (by absorption and fractionation) to produce refinery fuel (ethane and lighter), cracked gasoline, and feed (propylene and isobutane) for alkylation.

Gasoline accounts for 85% of the refinery's liquid product of about 13,500 b/d.

Refinery gasoline yield is 1 bbl. for each 1.35 bbl. of raw materials. This is high, particularly in view of the small gasoline content of the crude.

The gasoline made will be marketed as Gulf Crest, Gulf No-Nox, and Good Gulf through Gulf service stations.

Other refinery products include kerosine, diesel fuel, sulfur, propane, and butanes.

Design sulfur capacity is 27 tons a day, but current operations are making about 17 tons a day.

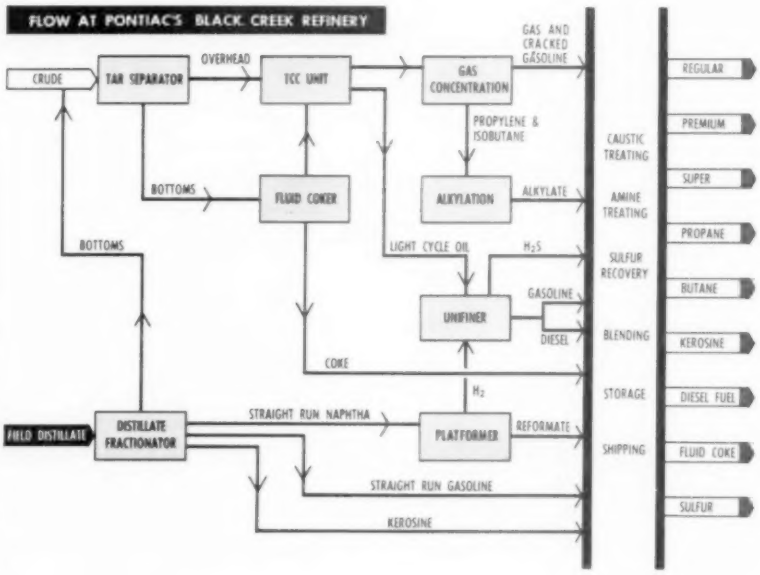
Propane is sold as LPG, while the butanes produced in the refinery are blended with motor gasoline.

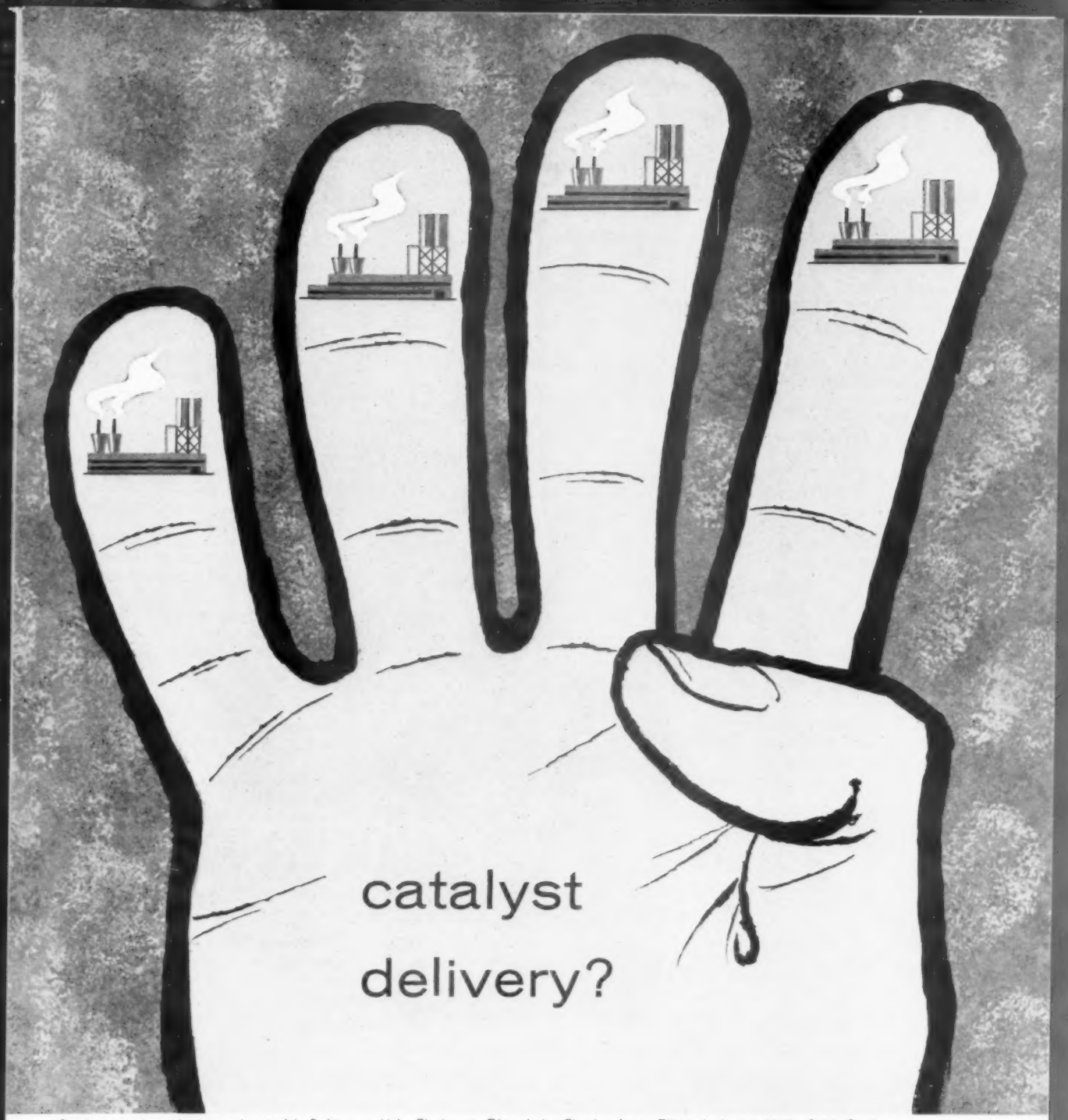
Other process streams, not marketed or used in other process units, are used as refinery fuels.

Fuel burned in the refinery consists of the total production of coke (200 tons a day), heavy fuel oil, and light gases (ethane and lighter from the gas concentration unit).

In addition, some natural gas is purchased.

FLOW AT PONTIAC'S BLACK CREEK REFINERY





Davison catalyst plants are located in Baltimore, Md.; Cincinnati, Ohio; Lake Charles, La.; affiliated plant in Valleyfield, Quebec.

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What's New / IN PROCESSING

Bishop Oil & Refining Co. has run into a snag with its plans for a $19-million refinery near Phoenix, Ariz.

The oil company has requested zoning to permit the refinery to be built on a 480-acre tract 5 mi. northeast of Beardsley and some 20 mi. west of Phoenix.

Opponents of the refinery say that smoke and fumes would produce smog, affecting Phoenix as a resort center. Bishop Oil has assured authorities that the refinery would cause no more smoke and fumes than the cotton gins that are common in this area.

•

The Texas Co. is adding a Udex unit to its Wilmington (Calif.) refinery. Construction on the 7,500 b/d unit will begin in May and is scheduled for completion in February, 1959. Ralph M. Parsons Co. has been awarded the engineering contract.

•

Residual oils might power high-temperature gas turbines in the future by using additives to reduce corrosiveness of hot combustion gases.

As reported to the American Society of Mechanical Engineers by Gulf Research & Development Co., there are many substances able to alleviate the excessive corrosiveness of combustion gases from low-grade gas turbine fuels.

A few of the successful corrosion inhibitors include micronized talc, magnesium oxide, and potassium permanganate. Costs for these range from less than 1¢ to 11¢ per bbl. of residual oil.

•

Hercules Powder Co. reports that its polypropylene plant at Parlin, N.J., (PW—Dec.6'57,p16) is operating satisfactorily.

The plant, first to produce polypropylene in the U.S., is now turning out "commercial quantities on a continuous basis," though not yet at its designed capacity of 20-million lb. a year.

•

Nuclear energy poses no threat to the future growth of the petroleum industry, according to James H. Doolittle, Shell Oil Co. vice-president.

In fact, says Doolittle, nuclear energy may aid the oil industry by eventually replacing heavy residuals in the power generation field. These residuals can then be converted into lighter, more valuable products.

Currently, the cost of nuclear-generated electricity is about double that of coal, oil, or gas-fueled generators.

•

A combination UOP Platforming-Unifining unit has gone on stream at the Heide (Germany) refinery of Deutsche Erdol-Aktiengesellschaft.

The unit has an ultimate capacity of 4,000 b/d, but is being operated initially at 2,000 b/d. Feedstock handled by the unit can be either a 50-50 blend of Heide-Arabian crudes or a blend of 80-20 Heide-Arabian.

The Platformer is the sixth operating in Germany.

•

Safety records fell during 1957 for Esso Standard Oil Co. and Chemstrand Corp.

Esso's Charleston (S.C.) asphalt refinery completed its eighth consecutive year without a disabling or lost-time injury. This is a record for any Esso refinery.

At Baton Rouge, Esso's refinery had its safest year since 1939. The 1957 accident rate was 1.29 disabling injuries per million man-hours, compared to the 1939 rate of 1.19.

Chemstrand's research and development division, at Decatur, Ala., received the National Safety Council's highest award for industrial safety. The division has completed over four years and nearly 3¼ million man-hours without a lost-time injury.

•

American Bitumuls & Asphalt Co. is building a new bitumuls emulsified asphalt plant at Seattle, Wash.

Location of the plant will be at the Richmond Beach distributing plant of Standard Oil Co. of California (parent of American Bitumuls).

Production from the new plant is scheduled for about May 1.

•

Goodyear Tire & Rubber Co. will commercialize its new polyester film with a plant at Apple Grove, W. Va.

The polyester, called Videne, is now being made in limited quantities at Akron, Ohio. The new plant will cost $9-million, and is expected to be in production in early spring, 1959.

Reportedly, the new material is based on dimethyl terephthalate and dimethyl isophthalate.

•

Koppers Co., Inc., has formed two new divisions to replace its former chemical division—the plastics division and the chemicals and dyestuffs division.

Reason for the change, according to Koppers, is a greatly increased production of plastics and chemicals during the past ten years.

Output-Doubler

Expansion of Shell Oil Co.'s Iowa (La.) natural gasoline plant is a step nearer completion by the placement of a 125-ft.-tall de-ethanizer tower.

The new tower will almost double the plant's current output capacity, by more efficient recovery of butanes and propanes than previously possible.

About 40% of the expansion program is done, with completion scheduled for early spring—at which time, the plant will be able to recover 40,000 gal. a day of natural gasoline from 55-million cu. ft. a day of natural gas. Present capacity—from the same amount of gas—is only 23,000 gal. a day.

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Successful and profitable operations in the oil refining industry depend on accurate, complete, up-to-the-minute facts about all phases of management, manufacturing and marketing. UOP now offers refiners, potential or established, its comprehensive market research and economic evaluation service to provide all essential information from one qualified source. This service can provide a full and accurate analysis of all the factors affecting a successful operation. It covers such things as evaluation of markets and potentials, geographic factors and marketing trends, management and personnel analysis, product recommendations, process application planning, equipment analysis, financial requirements, earning potentials, facilities, manpower and raw material supply. Or whatever "knows" you need to know. UOP's more than 40 years of service to the refining industry is good insurance that you can depend on our providing the facts and guidance to help you to the most efficient and effective refining operation. This service is available to any refiner, anywhere, regardless of the size or scope of his operation.

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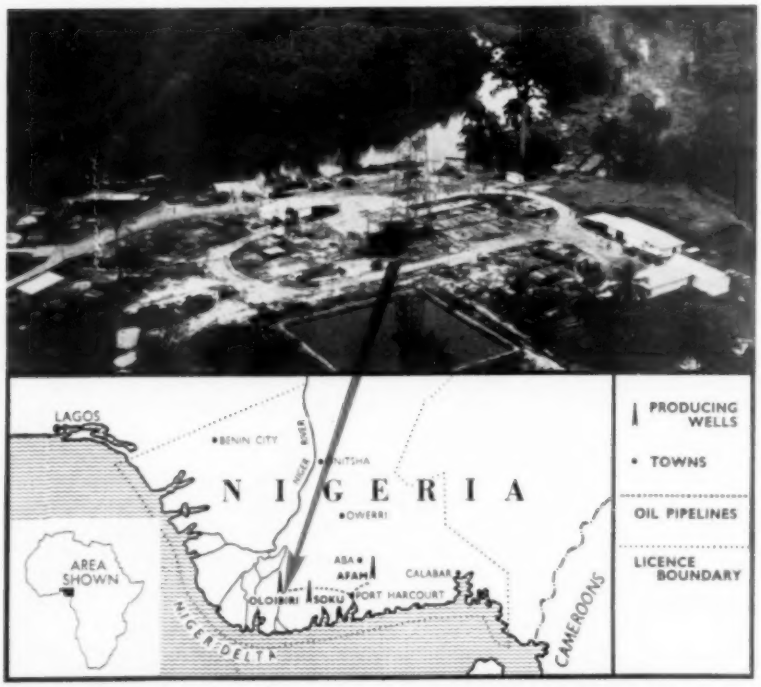
INTENSIFIED EXPLORATION is slated for the mangrove swamps, where seismic workers disembark to lay out line as . . .

First Nigerian Oil Reaches Europe



OLOIBIRI DISCOVERY, first of three for Nigeria, is being linked to Port Harcourt by a 10-in. pipeline. Aerial view also shows water transport unloading point and offices.

Exploration is being aggressively pushed in Nigeria as the first shipment of oil arrives in Rotterdam, The Netherlands. There, the cargo will be evaluated at Shell's Pernis refinery (PW—Jan.24'58,p38).

A Shell-British Petroleum company has now found oil in a third area, Soku. The company expects to be test-producing about 6,000 b/d in the near future from its first two discovery areas, Oloibiri and Afam.

The company now estimates that it will take until late 1958 before it can be determined whether sufficient oil can be recovered from the Oloibiri and Afam areas to warrant construction of permanent export facilities in an area that lacks a natural harbor.

In line with intensive exploration, Shell-BP expenditures this year are running at the rate of $2.8-million a month. Some $75-million has already been spent on its 21-year hunt for oil.

At present, the Shell-BP company has five drilling strings and seven seismic parties operating. The number of rigs is expected to jump to eight or nine by the end of 1958. Two marine drilling tenders will be used, and four helicopters will be kept in operation.

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**Bell Model 47 series helicopters approved for extended operation include the 47G and 47G-2. Military versions of these models are the Army and Air Force H-13G's and H-13H's and the Navy HTL-6's.

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of gravity to be of greatest benefit
must be clearly interpreted
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New French Oil Area May Be Near

PARIS—Hopes of establishing oil production in a new area of France were boosted last week with testing of the first potentially commercial oil find in the Paris Basin.

The discovery was made close to Coulommes, about 25 mi. northeast of Paris, in a wildcat drilled by a French independent, controlled by the Nahmias Bros. interests.

The well, CS-1, is the first drilled by Soc. Petroliere de Recherches dans la Region Parisienne (Petrorep), following 15 months of preliminary exploration.

The Coulommes wildcat flowed 56 bbl. of 44.5-gravity oil on initial two-hour drillstem test of the interval at 6,077-152 ft. in the Mid-Jurassic.

The pay zone is oolitic limestone with the very high permeability of 200 millidarcys. It is reportedly 37 ft. thick, apparently in the upper portion of the 75-ft. tested. A second test below the first produced only salt water.

The well is now being carried toward 10,000 ft. in the hope of finding further pay zones lower in the Jurassic and in the Triassic.

The wildcat, according to the company, is being drilled close to the top of the Coulommes structure. This was outlined by seismic surveys and core drilling and runs in a northeast-southwest direction. It is said to be 15 mi. long and 7 mi. wide, with a 300-ft. closure.

The well, which found the top of the Jurassic at 3,510 ft., is 27 mi. northwest of the nearest wildcat. That test, a dry hole at Courgivoux, had an oil show in the Mid-Jurassic and a gas show in Triassic sandstone before hitting granite at 10,166 ft.

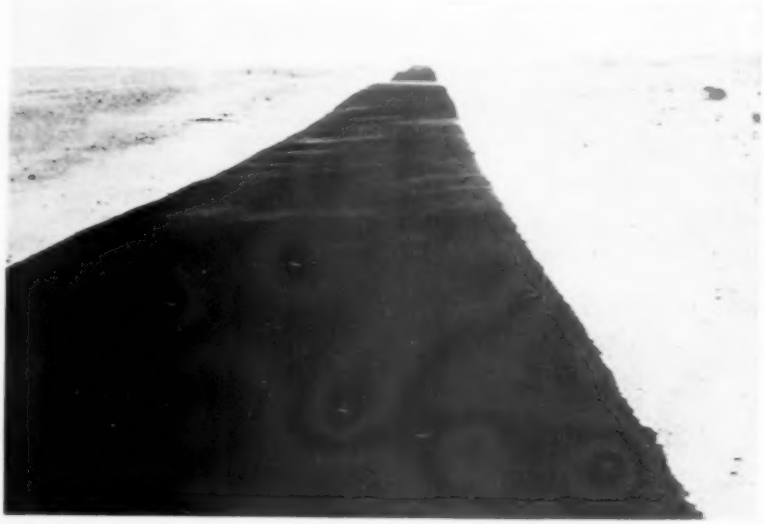
Though slight oil shows, as well as gas shows, have been encountered in several wildcats in the Paris Basin, Coulommes is the first to produce even a potentially commercial amount of oil on test.

Some 75 mi. to the northwest, the government's Regie Autonome des Petroles found oil in its No. 101 Bray.

Similar results were encountered about 70 mi. south of Coulommes in 1956, in Cie. d'Exploration Petroliere's Chateau Landon wildcat.

Further results of the Coulommes wildcat will be watched by several companies that are centering their exploratory interest in the Paris Basin.

Besides attracting strictly French companies, the area has also drawn the attention of international firms such as Socony, Shell, and Caltex (whose French affiliate is now preparing to spud its fourth wildcat).



Hunt for Oil Rolls on Ribbon of Oil

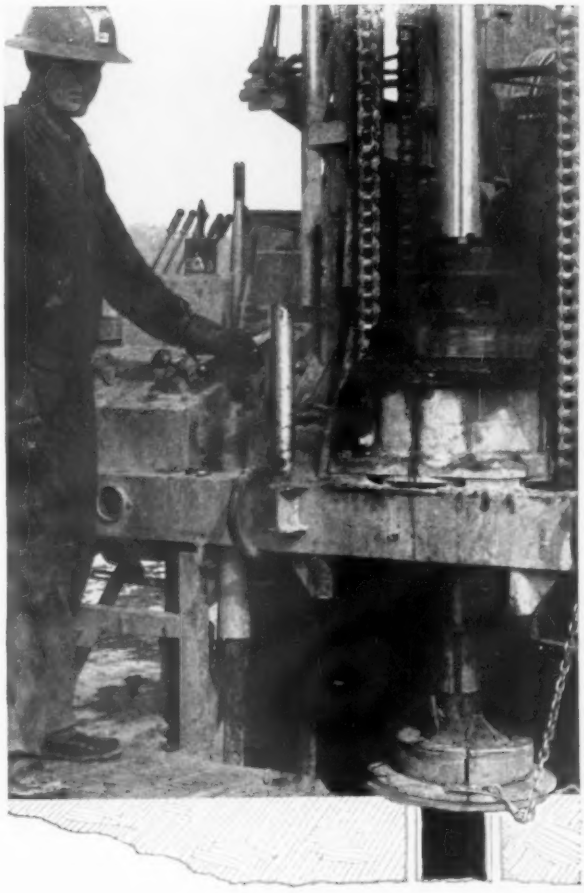
The oil push in the Sahara will bring many more asphalt highways like this one, now being used to transport oil exploration equipment through the Algerian desert.

A network of such roads will be laid in the next two years to speed exploration, in line with French aims to meet a 200,000 b/d Sahara oil production goal in 1960.

Rides with the bit through rock ...speeds big bore hole cuts...

GARDNER-DENVER "MOLE-DRIL"*

* TRADE-MARK



Here's added power for your seismograph rig—hard-hitting, in-the-hole power. "Mole-Dril" speeds shot hole drilling . . . and deep hole drilling in hardest rock.

It's easy to use—the "Mole-Dril" screws directly onto the bottom of standard drill pipe . . . a tungsten-carbide "X" bit screws directly onto drill tappet. That's all the "make-ready" it takes to send the "Mole-Dril" through rock.

It's powerful—"Mole-Dril" delivers more foot-pounds of energy to the bit than any other drill of its size. Every pound of hammer energy is transferred directly to the bit.

It's rugged—the "Mole-Dril" has only three moving parts, nine major parts. This simple, rugged construction gives the "Mole-Dril" lasting deep hole drilling durability.

Two models available:

Model AM4 for drilling $4\frac{3}{4}$" diameter hole.
Model AM6 for drilling $6\frac{1}{2}$" diameter hole.
Write for bulletin.

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Drill exhaust air passes out up-cast air ports and gives cuttings an additional out-of-the-hole boost.

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What's New / AROUND THE WORLD

Mideast Crude Output Nears 4-Million b/d

A new crude production record in Iran pushed total Middle East output in January to a new all-time high of 3,909,510 b/d.

Iran's average soared to 842,000 b/d, a 116,000 b/d jump over last month. This is well over the previous all-time high of 763,000 b/d, set last year in both August and October.

Total output from key producing states topped the previous high of 3,878,100 b/d, set last July, by some 31,000 b/d.

Here are the totals, in 000 b/d:

	Jan. '58	Jan. '57	Dec. '57
Kuwait	1,315.4	909.4	1,276.1
S. Arabia	978.4	665.2	1,053.3
Iran	842.0	653.0	726.0
Iraq	614.4	221.3	625.0
Qatar	159.3	126.9	169.1
Total	3,909.5	2,575.8	3,849.5

•

Oil Demand Sags in France

FRANCE—While only the fast growth-rate of oil demand has slackened generally in Europe, France's oil consumption last year actually dropped 2% below 1956.

Total oil demand dropped to 385,840 b/d, from 393,840 b/d in 1956. Inland consumption accounted for 352,100 b/d of the 1957 total, and bunkers 33,740 b/d.

According to the Comite Professionnel du Petrole, gasoline demand dropped 2.9%, gas oil 8.1%, and heavy fuel oil 4.4%. Demand for light fuel oil, however, rose 7.5%.

The year's decline was partly due to rationing that followed the Suez crisis.

With the notable exception of oil-development investments, most oil industry operations slumped last year.

The trade association's final 1957 report, published last week, showed:

- French investments in oil exploration and development jumped some 80% to $250-million, from $138.1-million in 1956.
- Crude imports dropped to 481,240 b/d, from 500,260 b/d. The share from the Middle East also dropped, to about 78%, from 91% in 1956.
- Refinery crude throughput was cut to 499,300 b/d, from 536,020 b/d in 1956, although total French refining capacity was boosted to 669,700 b/d, from 621,700 b/d. Thus, about 75% of refining capacity was utilized last year, as against about 86% the year before.
- Product imports more than doubled, to 54,880 b/d, from 25,760 b/d in 1956.
- Total exports, including foreign ship bunkering, dropped to 90,920 b/d from 113,820 b/d.

•

ALGERIA—CREPS' new Zarzaitine wildcat oil discovery near the Libya border looks like one of the biggest Sahara producers so far. It was completed to flow 3,500 b/d.

CREPS, a Shell affiliate, announced the completion of the ZR-2 last week.

It did not disclose the thickness of the pay zone, which was topped at 4,429 ft. (PW—Feb.7'58,p49).

The company said the rig is now being moved ¾ mi. east of ZR-2 for a stepout. The new oil find is 31 mi. north of the company's shallow Edjele field. Both areas border acreage on which Esso recently found Libya's first oil in a shallow well testing 500 b/d.

•

FRANCE—The prospect of exporting oil products from northeastern France into neighboring European Common Market areas now has Shell planning a new refinery in that area.

Two French groups already have announced plans for new refineries there, and Caltex is now weighing possible participation in one of the new plants.

Shell's plant would be located on the Rhine River between Colmar and Strasbourg, with site and capacity yet to be decided. The two other plants will be in the 60,000 b/d range. One will be built at Strasbourg by a group headed by Cie. Francaise des Petroles, the other near Dijon by Omnium Francais de Petroles (PW—Dec.13 '57,p58).

A 22-in. pipeline through eastern France from the Mediterranean is being planned to carry both Sahara and Middle East crude to the new refineries. Omnium originated the plan for the line, which would run 435 mi. to Strasbourg from Lavera, near Marseilles. Companies involved in the various refinery plans presumably would participate in its construction, but no specific details have yet been disclosed.

•

ARGENTINA—Paradoxically, foreign oil companies may yet share in developing Argentina's oil—under a new ultranationalistic president.

A trial balloon was put out last week after president-elect Arturo Frondizi, in his first postelection contact with the provisional government, asked for a speedy solution of the oil problem.

It took the form of an official announcement by the Industry Minister of a 12-point oil plan originally proposed by Mauricio Yadarola, Argentina's Ambassador to the U.S.

The plan calls for foreign companies to explore for and produce oil under contracts with Yacimientos Petroliferos Fiscales, the state oil entity, which would retain all marketing rights for the oil produced.

The plan is believed to be a compromise formula that is acceptable to all parties.

A strong refutation of it by YPF just before the detailed announcement last week drew angry comment from the provisional government. Said the Industry Minister: "Truly patriotic politicians must not deafen the Argentine people with verbal sallies. The people must know that it will be impossible for Argentina to become self-sufficient in oil by 1960. We lack $800-million to develop our oil resources, and the oil deficit must be covered urgently."

•

SAUDI ARABIA—The two significant wildcats in which Aramco found oil last fall have now been completed—one offshore in the Persian Gulf, the other far inland, on the edge of the company's concession area (PW—Oct.11'57,p82).

The offshore well, No. 1 Manifa, is the first to find oil in the Yamama formation, which initial tests indicate is "highly prolific," Aramco said last week. The formation lies above the Arab Zone.

The well was drilled to total depth of 9,637 ft. and plugged back to 7,892 ft. It was completed through perforations at 7,615-800 ft. and 7,810-65 ft., both in the Yamama formation. The oil is about 26-gravity sour crude.

Far inland, initial tests of the No. 1 Khurais have indicated flowing rate of about 3,000 to 4,000 b/d of 33-gravity sour crude Aramco said. The well was plugged back to 4,975 ft. from total depth of 10,621 ft. It was completed in the Arab D member and the upper part of the Jubaila formation.

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TRUCKSTOP STATION at Ashland, Va., is one of many that are playing a key role in Pure Oil Co.'s planning, as . . .

Pure Spreads 24-State Network to Catch Tr

Pure Oil Co. is sweeping into an ambitious truckstop-building program that will sprinkle its 24-state marketing territory with some 300 truck outlets.

Though Pure has had some truckstops for about 20 years, its concentrated building program didn't get under way until July, 1953. That's when the company purchased a 100-station chain—including seven modern truckstops—from J. V. Sanner, who now heads the special outlets development department.

Pure decided to combine these with its 17 existing truckstops and launch a major truckstop-building program. By the beginning of 1958, the chain had mushroomed into 177 outlets.

The expansion program is strengthening Pure's front-rank position in the operation of big "Class I and Class II" truckstops. Pure has 81 such layouts, according to a new survey of 13 large oil companies by Fleet Owner, a McGraw-Hill publication.

The survey defines Class I truckstops as those having 24-hour service, road service, cargo storage facilities, adequate parking for tractor trailers, diesel fuel, sleeping quarters, showers, and restaurant.

Class II stops have all these facilities, except one or more of the last three items. Class III stations must have 24-hour service, diesel fuel, and road service. Class IV outlets are any others designated by suppliers as truckstops, but lacking the facilities of the higher classes.

The 13-company survey, covering about half the oil majors, lists 2,565 truck stops, with the following breakdown: Class I, 275 stations; Class II, 442; Class III, 308; and Class IV, 1,540. A state-by-state listing appears in Fleet Owner's 1958 Data Book.

Pure's goal is to have an integrated chain of stops along truck routes—at fairly consistent intervals—all the way from North Dakota to Florida.

Behind Pure's decision to launch such a broad program is the philosophy that there is a big sales potential in offering fleet owners a single type of service facility along their complete route. By patronizing stations spotted geographically, the longhaul trucker can drive a day's distance, then stop off overnight and have complete truck service while he rests.

Before launching its program, Pure studied truck routes, and counted truck traffic to determine station locations.

The station sites were picked first on main north-south arteries. Then the east-west routes were worked in. Automobile counts were ignored, because—although cars are welcome at truckstops—many motorists are discouraged from stopping by the sight of a lot of trucks.

Many of Pure's locations are now concentrated in Ohio and Florida,

Best truckstops offer: Good service . . .

Truck Trade

but the company plans to spread these out more evenly in the 24-state territory.

About 75% of the truckstop lessees are new Pure dealers. This has called for a special training program, managed by one of the company dealers.

Most of the stations are lessee stations, although a few are company-operated.

Frank Talarico, who operates a Pure truckstop station on U.S. 20 near Conneaut, Ohio, has been running the training program for two years. Since he took over, 125 men have been trained.

About three or four regional meetings are held for station men every year—each in a different area of Pure's marketing territory. Average attendance is about 15.

An integral part of every truckstop is a modern restaurant and low-cost bunkhouse—gearing the facilties to one-stop service. Cost of the stations ranges from $75,000 to $175,000.

All of the stations stay open 24 hours a day, 7 days a week. The largest station has 37 employees, not counting restaurant workers. In some cases the restaurant is operated by the dealer (or the dealer's wife). In other cases, the restaurant is leased out.

No alcohol is served in any of the restaurants.

The bunkhouses feature air-conditioned, individual rooms—equipped with television sets and bed lamps. The price of an overnight stay ranges from $1.75 to $3.00 a man—cheaper than most motels or hotels.

Most of Pure's truckstops handle only light repairs. But they all sell two grades each of gasoline and diesel fuel, plus a complete line of truck TBA items.

The lubritoriums generally have two bays. One of the large stops, at Bloomington, Ill., can handle 8 or 10 trucks at once. It also has lanes for state inspection and heavy repairs.

A few stations have eight pump islands, but most have two to four, with four pumps per island. A few stops also sell propane.

The underground storage capacity ranges from 40,000 gal. to 80,000 gal. Pumping is usually by remote control.

The average gasoline fill-up is 100 gal. to a customer, with most sales for 2¢ per gal. less than the going passenger-car price.

The 2¢ discount is offered only when 50 gal. or more are purchased, so it is not available to passenger cars. No trading stamps or giveaways are offered at any of the stations.

Pure's truck-credit plan allows a driver to have all his expenses for one run put on the same bill.

For instance, a trucker may be billed once for all costs on a trip from Fargo, N.D., to Key West, Fla. The fleet owner may designate certain stops for his driver, and have the billing handled by one statement out of Pure's Chicago headquarters.

In some cases, the stops are also timeclocked by dealers, with the dealer doing all the record-keeping. Or the trucker has a choice of the customary plastic credit-card plan.

Direct-mail brochures and post cards go monthly to about 45,000 fleet owners and truck industry people. These mailings give information on new truckstop locations, changes in roads and weight limits, detours, and general information.

Good food . . .

Good rest

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High on the list of American business achievement stands the swift efficient movement of millions of tons of material – made possible by an endless variety of automatic, time-and-labor saving machinery. Petroleum plays a vital role in this development. In the hydraulic cylinders of lift trucks, for example, move petroleum liquids that revolutionized the art of fast, cost-controlled distribution. Texaco scientists pioneered in creating these amazing hydraulic fluids which change pounds of pressure into tons of lift. The chemical sinews of these liquid muscles are the result of a partnership of research and industry in which Texaco scientists daily seek the new way, the better way.

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TEXACO

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What's New / IN MARKETING

The possibility of a new market for diesel fuel is offered by a diesel taxicab in South Bend, Ind. Operated by Indiana Cab Co., the taxi is a German-built Mercedes-Benz distributed by Studebaker-Packard Corp.

The cab's 46-hp. engine is getting 42 mi. a gal. under city driving conditions. Though the Mercedes cab costs $1,000 more than U.S. cars, Indiana Cab Co. thinks it will save $1,000 a year in fuel costs alone. The firm has been buying diesel fuel at 19¢ a gal., far below local gasoline prices.

•

American Oil Co. last week moved its unleaded premium gasoline into the big New Orleans market. Supported by heavy advertising, the Amoco-Gas went on sale at 150 Pan-Am stations. (American Oil and Pan-Am Southern Corp. were merged early last year, and this is the first time Amoco-Gas has been sold in Pan-Am's territory.) The product is the nation's only premium or regular major brand gasoline that does not contain tetraethyl lead.

•

Anchor Petroleum Co. is opening up a new LPG market north of the border in Saskatchewan. The Tulsa firm has signed a long-term contract to market the propane output of a plant being built by Steelman Gas, Ltd., northeast of Estevan, Sask.

Since the plant is 600 mi. east of other large propane producing facilities, Anchor will be serving a virtually new market.

•

Gasoline octane ratings continue to creep higher. Ethyl Corp.'s latest survey shows that the national weighted average ratings for premium and regular gasoline both rose 0.1 octane numbers in February—to 98.5 and 91.1, respectively. The premium average is now 1.2 higher than a year earlier. The regular average is up 0.7.

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High-Voltage Sale

This "time machine" is being used at Shell Oil Co.'s spring sales meetings to show station dealers how to prepare for the future. That's Prof. Kronkase (described by Shell officials as "a real screwball"), ready to throw switches to show how retail markets will expand. Machine has rear-screen projection of film to get across merchandising points to dealers.

All day long, it's **HURRY—HURRY—HURRY!**

But there's still time to be well informed on the whole oil industry—with Petroleum Week's variable-speed reading

The essential facts and main points of interest in every article are set in bold-face type like this. Just by scanning these bold-face items you get a fast-reading summary of every story, in quick, capsule form.

For the complete story on all items of particular interest to you, read the light face type as well as the bold. It's as easy as that!

This variable-speed reading technique, pioneered by Petroleum Week, is especially designed for busy oil men like you—to give you all the information you want and need in the shortest possible time.

DEPT/Personals

P. C. SPENCER, president of Sinclair Oil Corp., New York, has been elected treasurer of the American Petroleum Institute. He succeeds **B. B. Jennings**, who retired recently from Socony Mobil Oil Co.

P. C. Spencer

H. Siert

HARRY H. SIERT has been promoted to vice-president and treasurer of Northern Natural Gas Co., Omaha, Neb. He has been treasurer since 1948. Other promotions include **Frank H. Roberts** to chief accounting officer and **Ernest M. Petersen** to assistant to the president and assistant secretary. Roberts was formerly assistant controller; Petersen was administrative assistant to the president.

DONALD R. KEE, Dallas attorney, has been named vice-president and general counsel of Talon Petroleum C. A., Falson Petroleum Corp., and Gulf Coast Leaseholds, Inc., all Cecil V. Hagen interests. Kee, formerly with the Clint Murchison interests, will move to Houston. Falcon Petroleum is U. S. agent for Talon, a Venezuelan oil company with oil production on three concessions in Western Venezuela.

SAM SAUL, former Denver district landman for Pan American Petroleum Corp., has joined Davis Oil Co. as Oklahoma City division exploration manager.

NAT AZAROW has been named executive secretary of the newly formed American Gasoline Dealers Assn., New York. He is also executive secretary of the Gasoline Merchants of Brooklyn.

WILLIAM G. HARMON, DiKor, Inc., Carmi, Ill., is 1958 chairman of the API's Illinois Basin chapter. Other incoming officers include **James Anderson**, Ohio Oil Co., Terre Haute, Ind., first vice-chairman; **Harry Swannack**, Gulf Oil Corp., Evansville, Ind., second vice-chairman, and **R. C. Curtis**, Sun Oil Co., Evansville, secretary-treasurer.

T. E. HULL transfers from Billings, Mont., to Bismarck, N. D., as district geologist for Pan American Petroleum Corp. The company closed its Billings district office on Feb. 1.

HERBERT D. THORNTON, former manager of McElroy Ranch Co.'s Rocky Mountain division, has joined the petroleum division of Union Carbide Corp.'s general purchasing department, in New York. Members of this department coordinate the purchase of petroleum hydrocarbons for raw material and fuel as required by various divisions of the corporation.

K. E. GARDNER succeeds the retiring **W. B. Englebrecht** as assistant to the assistant manager of wholesale sales of Phillips Petroleum Co., Bartlesville, Okla. Gardner, with the company since 1945, has most recently been associated with the sales department in wholesale and export sales.

T. K. DAVIS, J. L. PARRISH, and **B. J. WHITLEY** have been named general superintendents of Tennessee Gas Transmission Co.'s gas transmission department, in Houston. Davis will be in charge of the compressor, measurement, and gas control sections. Parrish will be responsible for pipeline construction, research, corrosion control, and radio operations. Whitley will handle the operation and maintenance of pipeline facilities, in addition to his present assignment as manager of the transmission rights-of-way section. Two newly appointed assistant chief engineers are **Ross O. Parker, Jr.**, and **George W. White**.

JOHN J. COATES will replace the retiring **Carter Wasson** on May 1 as manager of Esso Standard Oil Co.'s Pittsburgh grease plant. Coates, former assistant head of the technical division of Esso Standard's Baton Rouge (La.) refinery, transferred to Pittsburgh on Mar. 1 as assistant manager, and will succeed Wasson upon his retirement.

J. BRUCE CHENAULT, auditor in Pan American Petroleum Corp.'s Oklahoma City central division, moves to Caracas this month as industrial relations supervisor for Pan Venezuelan Oil Co., a Pan American subsidiary. Before leaving to assume the new post, he will undergo a period of orientation at the company's general offices in Tulsa.

FRED A. McKINNON will manage exploration for Triad Oil Co., Ltd., in Calgary. He has been exploration manager for Royalite Oil Co., Ltd., since 1949.

F. A. McKinnon

E. R. Jones

E. R. JONES succeeds **F. W. McCurry** as supervisor of all manufacturing operations at Derby Refining Co.'s Wichita (Kan.) refinery. McCurry, formerly vice-president in charge of manufacturing, retired recently. He will continue to serve as a director, and act as a consultant on refinery problems. Jones joined Derby in 1939 in the operating department.

JOHN R. MITCHELL is the new administrative assistant to the sales manager of Ohio Oil Co., in Findlay. Mitchell, coordinator and assistant to the Robinson (Ill.) district manager since 1951, succeeds **H. L. Knapp**. Knapp recently became assistant district sales manager, in Robinson.

J. R. Mitchell

W. H. Doyle

W. H. DOYLE has joined Kerr-McGee Oil Industries, Inc., as vice-president in charge of branded marketing, in Oklahoma City. He has been manager of the Cleveland sales division of Standard Oil Co. of Ohio.

FRED TERRY succeeds **C. R. HILL** as scout, in Amarillo, Tex., for Phillips Petroleum Co. Terry was formerly a title clerk, in Bartlesville, Okla.

BILL TOMBERLIN, an independent active in the Rocky Mountain area, has opened offices in Beverly Hills, Calif. Rocky Mountain operations will continue under the direction of Tomberlin's Denver office.

DONALD R. WILLIS has resigned as landman and supervisor of lease records for Husky Oil Co., Cody, Wyo., to open offices as an independent lease broker in Billings, Mont.

C. EDWIN MOHLER, geologist-engineer, will be in charge of the new Tulsa office of Jet Oil Co.

HERBERT H. LANK, Montreal, president of Du Pont Co. of Canada, Ltd., has been elected a director of Hudson's Bay Oil & Gas Co., Ltd.

PAUL V. BAKER, with Continental Oil Co., for the past twelve years, has joined Garvey Drilling Co., at Wichita, Kan., as safety director.

PAUL R. WADDLE has resigned as a petroleum engineer for Carter Oil Co., to open consulting offices in Shreveport, La. He will specialize in reservoir performance studies, secondary recovery programs, oil and gas reserves, and valuation of oil and gas properties.

FRED R. HUMMERT assumes the newly created post of assistant treasurer for Shell Oil Co., New York. Hummert was former assistant manager of auditing; he will handle increasing activity in the fields of investment and finances.

JOHN J. WALSH has been elected vice-president of Penola Oil Co.,

Esso Standard Oil Co. marketing affiliate, in New York. Walsh, who joined Esso Standard in 1934, has been with Penola since 1946, most recently as manager of the wholesale lubricating oil department.

JOHN F. QUINN and **ALBERT J. GNESIN**, have been appointed district representatives of Davison Chemical Co., a division of W. R. Grace & Co. Quinn will have charge of the San Francisco office, and Gnesin the New York office. Both previously have been associated with Davison, and have extensive backgrounds in the oil and chemical industries.

RICHARD R. WILBER, formerly assistant supervisor in the crude oil coordination department of Standard Oil Co. (Ind.), Chicago, moves to New York as assistant manager of crude oil supply for American Oil Co., an Indiana affiliate. **Raymond F. Maldoon** is a newly appointed patent advisor at Soind's Whiting research laboratories. He most recently was a technologist in the Chicago development and patent department.

FORD M. GRAHAM has been appointed vice-president and senior representative for Monterey Oil Co. in Louisiana and Mississippi. As an independent oil and gas operator, he has served as a consultant to Monterey and other producers for the past four years. Graham will direct exploration activities in the area from offices in New Orleans.

W. C. TILLETT will manage exploration contracts for Tennessee Gas Transmission Co., Houston. He was formerly exploration manager of the Bellaire (Tex.) district.

R. J. C. PRINGLE has been appointed crude oil manager for Shell Oil Co. of Canada, at Calgary. He joined Shell in 1948, and succeeds **J. R. Hurley**, who has been transferred to San Francisco.

FRANK PACE, JR., president of General Dynamics Corp., has been elected a director of Continental Oil Co., Houston. He succeeds the late **William V. Griffin**. Pace was formerly Secretary of the Army and Director of the Budget.

J. E. Wilson

C. C. Ludwick

J. E. WILSON has been promoted to manager of the exploration research section of Shell Development Co.'s new research division, Denver, and **C. C. LUDWICK** succeeds him as Denver area exploration manager for the parent Shell. Ludwick has been exploration manager of the Casper (Wyo.) division since June, 1955.

MORTON A. STERLING has become president of Sunset International Petroleum Corp., Los Angeles, succeeding **J. D. Sterling**, who was recently elected board chairman. M. A. Sterling has been executive vice-president since 1955, and a member of the executive committee since 1956.

J. W. ROARK will manage the new Skelgas office opened by Skelly Oil Co. in Shreveport, La. The office will serve liquefied petroleum gas accounts in the Southern area and will be responsible for refinery sales of LP-gas. Roark is formerly of Kansas City, Mo.

JACK W. WILLIAMS is the newly appointed district sales manager for Oklahoma for Gulf Oil Corp., in Tulsa. He succeeds **Ed E. Oberholtzer, Jr.**, recently named district sales manager. Williams, with Gulf since 1947, has been a sales representative in Waco and Houston, Tex.

JOHN D. MOODY, former manager of the Midland (Tex.) district of Gulf Oil Corp.'s Ft. Worth production division, has been appointed exploration advisor, in the Pittsburgh production department. Moody will be concerned principally with exploration activities outside the United States.

HOMER O. WOODRUFF succeeds **Mark L. Terry** as The Texas Co.'s Oklahoma division production manager, Tulsa. Terry, with Texaco since 1929, has retired. Two newly named assistant general managers in Houston are **S. T. McCardell**, succeeding Woodruff, and **J. H. Markley, Jr.** McCardell was formerly assistant manager of the Louisiana division, in New Orleans; Markley was assistant manager of the West Texas division, in Ft. Worth. In the Rocky Mountain division, **Tom T. Freeman** transfers from Denver to Houston as manager of land evaluations. He is succeeded as division manager in Denver by **O. B. Hocker. George H. Clark**, assistant to the general manager, has become assistant manager of the South Texas division, in Houston, replacing Hocker.

L. C. STRATTON succeeds **John T. Reeves** as division production superintendent for Sinclair Oil & Gas Co., Ft. Worth. Reeves has taken a leave, and will retire this year. Stratton has been assistant division production superintendent at Ft. Worth since December, 1949.

GIULIO NATTA, of the Polytechnic Institute of Milan, has been elected a fellow of the New York Academy of Sciences. The award, a coveted one among scientists, was given to Professor Natta for his continuous meritorious scientific activities and contributions. Cited were his latest revolutionary discoveries in the field of stereospecific polymerization of olefins and diolefins, particularly the introduction of "isotactic" polypropylenes.

HARRY M. EISENHAUER has been appointed secretary of Hudson's Bay Oil & Gas Co., Ltd., Calgary. He joined the company's legal department last year.

WILLIAM B. FOWLER is the newly appointed assistant director of Texas Gas Transmission Corp.'s property tax department, in Owensboro, Ky. He has been with TGT since November, 1950.

W. B. Fowler

H. G. Dunn

H. G. DUNN has been promoted to assistant manager of Magnolia Petroleum Co.'s ad valorem tax department, in Dallas, replacing **G. R. Alexander**, who has retired. Dunn has been tax agent for Magnolia since 1948.

MARVIN E. HOUCHIN and **BYRON G. ANSORGE** are the newly named Oil Information Committee chairmen for Indiana and Illinois, respectively. Houchin is district manager for Socony Mobil Oil Co., at Indianapolis; Ansorge holds a similar position at Peoria, Ill., for The Texas Co.

EDWIN SINGER, president of Pontiac Refining Corp., Corpus Christi, has been elected board chairman of Wilshire Oil Co. of California. Wilshire was recently acquired by Pontiac. **Edwin G. Coopman** has become a director, president, and chief executive officer, succeeding **Robert O. Anderson**. Coopman was formerly president of Farm Chemical Co., and Bearco, Inc., gas distributing company in Northern California. Other officers are **Earle W. Allen**, former vice-president now executive vice-president; **Owens A. Dunnahoo**, re-elected treasurer; **John J. Corwin**, New York attorney, now secretary; **Herbert M. Singer**, New York attorney and **Richard Davy**, both new directors. Allen was reelected to the board.

CANADIAN PETROLEUM ASSN., Calgary, recently elected a new board of governors. Officers include **Vern Taylor**, Imperial Oil Ltd., chairman; **R. A. Cruickshank**, Canadian Devonian Petroleums, Ltd., first vice-chairman; and **Bart W. Gillespie**, Home Oil Co., Ltd., second vice-chairman. **R. C. Brown**, Hudson's Bay Oil & Gas Co., Ltd., is the retiring chairman. New members elected to the board of governors include **W. C. Howells**, McColl-Frontenac Oil Co., Ltd.; **J. S. Black**, South Saskatchewan Pipe Line Co.; **Paul L. Kartzke**, Shell Oil Co. of Canada, Ltd.; **H. G. Sehnert**, Sohio Petroleum Co.; **A. F. Beck**, Canadian Prospect, Ltd.; and **E. C. Babson**, Union Oil Co. of California.

JAMES S. MAHAN, JR., is to be manager of the retail gasoline marketing division of Frontier Oil Refining Co., Buffalo. He was formerly sales manager of the firm's Ashland (Ky.) marketing division.

How your truth dollars help keep the Reds in the red

• The truth dollars you give to Radio Free Europe help keep truth on the air behind the Iron Curtain.

And the truth is an enormously disruptive force to the Reds. For it keeps their captive people thinking . . . wondering . . . and less than completely dominated. The truth keeps needling the Reds. Breaks through their monopoly of lies. Keeps them unsure. Off balance. And thus the truth keeps up to forty fully armed Red divisions tied up policing Russia's satellite countries. Forty divisions, mind you, that might otherwise be put to more aggressive use elsewhere . . . and who knows where?

Your truth dollars keep the 29 super-powered transmitters of the Radio Free Europe network on the air . . . broadcasting the truth behind the Iron Curtain . . . every hour of every day.

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Because Radio Free Europe is a private, non-profit organization supported by the voluntary contributions of American business and the American people. And *your* dollars are urgently needed to keep it on the air . . . to help operate its transmitters, pay for its equipment and supplies, and its scores of announcers and news analysts in 5 languages.

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SEND YOUR TRUTH DOLLARS TO

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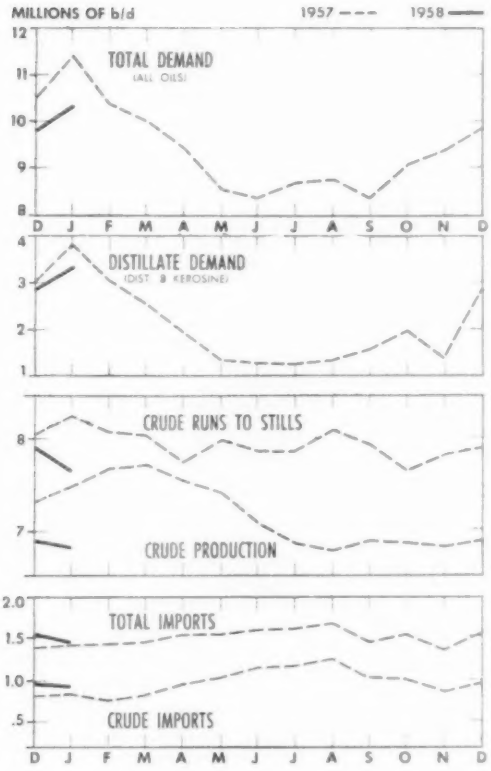
PETROLEUM WEEK'S

Fingertip Figures



Supply-Demand Figures for February

(millions of b/d)

	February 1958	% Change from year ago	2 months 1958	% Change from year ago
Total Demand (Inc. Exports)	10.523	+ 1.1	10.449	— 4.4
Gasoline	3.500	— 2.7	3.601	— 0.8
Distillates (Inc. Kerosine)	3.571	+15.7	3.452	— 0.8
Residual	1.852	— 4.8	1.796	—11.4
Total Supply	9.138	— 8.2	9.277	— 5.7
Domestic Crude	6.840	—11.0	6.863	— 9.4
Nat. Gas Liquids	.815	— 3.8	.848	+ 1.4
Total Domestic	7.655	—10.2	7.711	— 8.3
Crude Imports	.847	+ 8.6	.917	+15.6
Total Imports	1.483	+ 3.7	1.566	+ 9.7

RUNS TO STILLS
Latest week 7.560
Previous week 7.506
Year ago 8.076

CRUDE PRODUCTION
Latest week 6.841
Previous week 6.808
Year ago 7.519

TOTAL IMPORTS
Latest week 1.712
Previous week 1.081
Year ago 1.295

CRUDE IMPORTS
Latest week .927
Previous week .558
Year ago .737

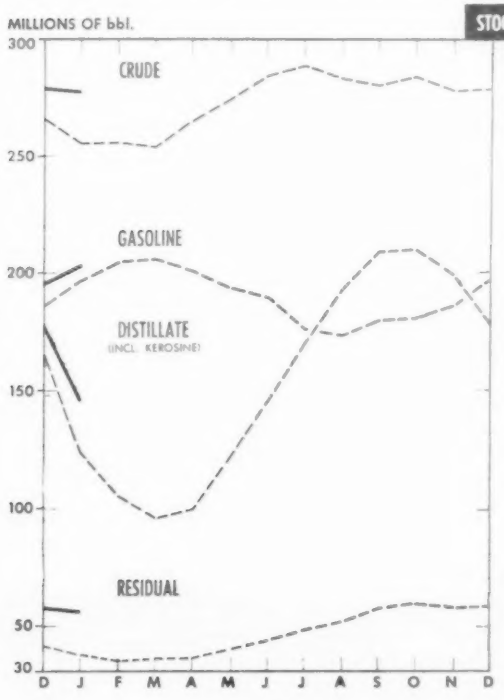
February was a very encouraging month for the industry, despite the crude price adjustments and cuts in operating rates. Total demand was 1.1% above a year ago, the first year-to-year increase for any month since last October.

The hike in February demand was due entirely to a large gain in distillates demand as a result of the cold weather. The total movement of distillates was up 15.7%.

Distillates inventories dropped 39,471,000 bbl. during the month, though gasoline stocks gained more than 10-million bbl.

The continued low domestic crude output, partially offset by a gain in imports, reduced the rate of new supply, resulting in an over-all reduction of nearly 38-million bbl. in total inventories.

Refinery runs in February, averaging 7,478,000 b/d, were 194,000 b/d below January. But an indicated shift in yields by refiners—boosting the gasoline yield slightly—was in part responsible for the gain in gasoline inventories despite the reduced runs.

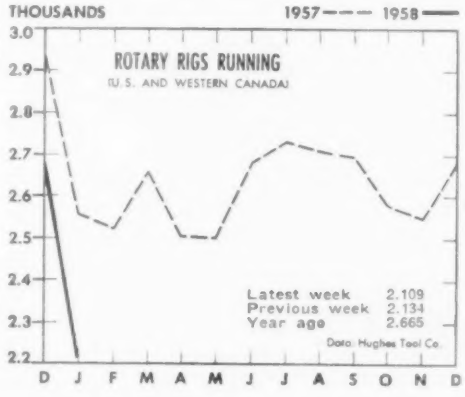


CRUDE STOCKS
Week-ended 2-22 285.0
Previous week 284.8
Year ago 251.7

GASOLINE
Latest week 215.2
Previous week 213.7
Year ago 203.7

DISTILLATES
Latest week 105.8
Previous week 115.3
Year ago 107.2

RESIDUAL
Latest week 54.2
Previous week 55.4
Year ago 37.1


THOUSANDS
1957 --- 1958 —
ROTARY RIGS RUNNING
(U.S. AND WESTERN CANADA)
Latest week 2,109
Previous week 2,134
Year ago 2,665
Data: Hughes Tool Co.
D J F M A M J J A S O N D

The Market Trend

Can Prices Make a Last-Ditch Stand?

Can prices bottom out somewhere along the line and hold? It's a question of weighty import this week to producers and refiners.

There are a few hopeful signs. Cold weather cut into light fuel oil stocks to the point where they may not represent a supply problem by spring. Also, heavy fuel prices at the Gulf have lost some of their flabbiness.

Last week, three major marketers found themselves low on distillates, and had to step up and buy spot cargoes. About five tanker loads changed hands—at discounts, probably, but sold nevertheless. This two-day buying flurry was very heartening to refiners.

Buyers are feeling their way cautiously, however. They don't want to be caught with surplus fuel oil inventories on Apr. 1. They're aware that sellers can be talked into discounts and price-protection gimmicks.

An example of this cautious trend shows up in a recent voyage charter: A marketer chartered a clean ship for two consecutive Gulf-New York voyages, but reserved the right to cancel the second trip right up until the first was unloaded.

The outlook still is uncertain. Northern consumer areas appear well supplied with fuel oils for the balance of winter. With ice-bound barges once again moving into Chicago; prices could weaken there. Discounting is intensified on light fuel oils in the Mid-Continent. Nothing much has been done to date to cut into the onerous stocks of heavy fuel on the West Coast.

And the next 60 days will be an important test period for gasoline, for refiners will have a hard time getting other refiners interested in spot product. With crude runs being held down, any refiner who needs gasoline has only to step up his own operations. Also, economy drives in many oil companies will tend to slow down spot purchases of motor fuel.

The recent cold spell, however, put one favorable twist on the gasoline outlook. It emptied a lot of clean tankage. If refiners can free enough clean storage, they won't have to sell distress gasoline before the motoring season arrives.

The Hard Sell: The new producers in Venezuela haven't slowed down a bit in their efforts to move crude to U. S. refiners. You'll be hearing about some new contracts in the very near future.

Cheap Gasoline: The town of Bristol, Conn., had the unfortunate distinction of the lowest gasoline prices in the nation last week. Suppliers were selling tank wagon lots to service stations there at 4.9¢ (ex taxes).

Weak Ships: Watch for a sharp tumble in black oil tanker rates in the Caribbean. Tanker traders say there are a pack of vessels coming into position in the next few weeks. Rate increases, they add, seem impossible. The likely result: More ships will go into lay-up.

The lay-up picture already is bleak. More ships of British registry are idle than at any time since the early 1930s.

The Market Place / AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of March 3

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U. S. Gulf Coast, cargoes
- Gasoline, 98 oct prem. 12.25-14
- Gasoline, 92 oct reg. 10.5-12.375
- Kerosine 8.875-10.5
- Heating oil, No. 2 ..... 8.5-10.25
- Gas oil, 48-52 d.i. 8.625-10.5
- Fuel oil, bunker "C" $2.25-2.45

Caribbean, cargoes
- Avgas, Grade 100/130 ..... 16.5
- Gasoline, 93 oct research prem. 10.75
- Gasoline, 87 oct research reg. 9.875
- Gasoline, 79 oct research 9.125
- Gasoline, 70-72 oct motor method 9
- Kerosine 9
- Heating oil, No. 2 ..... 8.5
- Gas oil, 48-52 d.i. 8.625
- **Fuel oil, bunker "C" ..... $2.25↓**

New York Harbor, barges
- Kerosine 10.35
- Heating oil, No. 2 ..... 9.65-9.85
- **Fuel oil, No. 6 ..... $2.65↓**

Okla-Group 3, northern shpt, bulk
- **Gasoline, 89 oct reg ..... 11.25↓-12.25**
- Kerosine 9.75-10.25
- Heating oil, No. 2 ..... 8.75-9.125
- **Fuel oil, No. 6 ..... $1.10↑-1.40**

Chicago, bulk
- Gasoline, 91 oct reg. 12-12.8
- Heating oil, No. 2 ..... 9.5-10.65
- **Fuel oil, No. 6 high sulfur ..... 6.65↓-7.25**

Los Angeles, rack
- Gasoline, 88 oct reg. 11.9-13.6
- Diesel fuel, PS 200 ..... 10-11.25
- Light fuel, PS 300 ..... $3.25-3.65
- Heavy fuel, PS 400 ..... $2.70-3.05

Natural Gasoline, Grade 26-70
- FOB Group 3 ..... 4.5
- FOB Breckenridge, Tex. 4

LP-Gas
- Propane, Oklahoma (Group 3) 5

Penna Lubes
- Bright stock, 25 p.t. 26-27
- 200 vis. neutral, 25 p.t. 24-25

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i. 24.5-26.5
- Neutral, solvent, 200-210 vis. 20.25-22.25

Gulf Coast Lubes
- **Bright stock, solvent, 95 v.i. ..... 24↓-26.5**
- **Neutral, solvent, 200 vis. ..... 20.5↓-23**

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130 ..... 17.5
- Gasoline, 79 oct research 10.375
- Kerosine 10.375
- Gas oil, 48 d. i. minimum 10.375

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9 ..... 2.85-3.07
- North Dakota, 36.0-36.9 ..... 3.07
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9 ..... 3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9 ..... 3.07-3.22
  - West Texas, sweet, 36.0-36.9 ..... 3.00-3.07
  - West Texas, N. M., inter., 36.0-36.9 ..... 3.00
  - West Texas, N. M., sour, 32.0-32.9 ..... 2.86
  - East Texas, flat 3.25
  - Mirando, 28.0-28.9 ..... 3.31
- Illinois Basin, flat 3.00-3.15
- **Pennsylvania Grade, Bradford dist. flat 4.40↓**
- California, Signal Hill, 21.0-21.9 ..... 2.93†
- North Louisiana-Arkansas, 36.0-36.9 ..... 2.92-3.02
- Wyoming sweet, 36.0-36.9 ..... 3.00
- Wyoming sour, 32.0-32.9 ..... 2.71

Canada (flat prices, at the well)
- Acheson-Stony Plain (Alta.) 2.68
- Leduc-Woodbend (Alta.) 2.74
- Redwater (Alta.) 2.63
- Daly (Man.) 2.46
- Smiley (Sask.) 2.40

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 48.0-48.9, Tucupido 3.75
- San Joaquin, 41.0-41.9, Puerto la Cruz 3.34
- Oficina, 35.0-35.9, Puerto la Cruz 3.05
- Tia Juana, Medium, 26.0-26.9, Amuay 2.55
- Bachaquero, flat, Amuay, Las Piedras 2.03-2.23
- Tarra, 38.0-38.9, San Lorenzo 3.08
- Lagunillas Heavy, flat, Amuay, Cardon 2.25-2.38

†*Differential per deg. of grav. varies.*

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura 2.08
- Safaniva, 27.0-27.9, Ras Tanura 1.79
- Iran, 34.0-34.9, Bandar Mashur 2.04
- Iran, 34.0-34.9, Abadan 1.99
- Iraq, 35.0-35.9, Fao 1.98
- Kuwait, 31.0-31.9, Mina-al-Ahmadi 1.85
- Qatar, 41.0-41.9, Umm Said 2.23

Middle East, Eastern Mediterranean
- Arabian, 36.0-36.9, Sidon 2.49
- Iraq, 36.0-36.9, Tripoli, Banias 2.49

Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, 37-38 ..... 2.75

KEY TANKER RATES

(Last paid, per long ton, single voyage)

U.S. Gulf-New York, clean (USMC +5%) $2.99↑
U.S. Gulf-New York, dirty (USMC —32½%) $1.92↓
NWI-USNH, dirty ..... (USMC —52½%) $1.28↑
NWI-UK/Cont., dirty ..... (Scale —35%) 21/2*
Persian Gulf-UK/Cont., dirty ..... (Scale —50%) 30/2*
Persian Gulf-USNH, dirty ..... (USMC —70%) $3.81

**Sterling.*

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Jackson 3-6951

Boston 6 — Edward A. Callahan, Jr.
350 Park Square Bldg.
Hubbard 2-7160

Chicago 11 — W. F. Holbrook
F. R. Emerson
520 North Michigan Avenue
Mohawk 4-5800

Cleveland 15 — J. E. MacArthur
1164 Illuminating Bldg.
55 Public Square
Superior 1-7000

Denver 2 — J. W. Patten
Mile High Center, 1740 Broadway
Alpine 5-2981

Houston 25 — D. O. Hanson
724 Prudential Bldg.
Jackson 6-1281

Los Angeles 17 — Peter S. Carberry
1125 W. Sixth St.
Madison 6-9351

New York 36 — Edward A. Callahan, Jr.
Donald R. Thompson
500 Fifth Ave.
Oxford 5-5959

Philadelphia 3 — W. A. Potter
6 Penn Center Plaza
Rittenhouse 6-0670

San Francisco 4 — William C. Woolston
68 Post Street
Douglas 2-4600

Tulsa 19 — J. A. Hartley
909 Enterprise Bldg.
522 South Boston
Gibson 7-5594

England, London E. C. 4 — Herbert Lagler
McGraw-Hill Co., Ltd.
95 Farrington St.

DEPT/Service & Equipment Companies

JOHN V. (Doc) PENNINGTON is the new vice-president of Globe Oil Tools Co., Los Angeles. He also will act as general manager. Pennington has had many years' experience in the rock bit business, serving with one manufacturer for thirteen years as works manager, research director, and vice-president in charge of manufacturing and engineering.

J. V. Pennington

C. O. Bartley

CHARLES O. BARTLEY is the new vice-president in charge of engineering and manufacturing, and a director, of Mission Mfg. Co., Houston. Bartley, with Mission since 1942, most recently was works manager.

SOUTHERN MARINE & AVIATION UNDERWRITERS, INC., New Orleans, has organized a subsidiary to handle insurance and reinsurance on offshore and onshore oil drilling and production equipment in Central and South America. The company, Southern Overseas Underwriters, Inc., will have the same officers as the parent.

DANIEL L. McGUINESS, JR., joins Proportioneers, Inc., a division of B-I-F Industries, Inc., as development coordinator, in Providence, R. I. He was formerly engineering production manager for Standard Coil Products Co. Proportioneers manufactures blending and chemical proportioning equipment for petroleum, industrial, and municipal applications.

W. H. PLOWMAN has been appointed manager of the Tulsa office of Goulds Pumps Inc., Seneca Falls N. Y. He replaces **J. P. Lonberger,** who was named manager of the Boston branch. Plowman has been a sales engineer for the company in the Tulsa district for 21 years.

R. K. HAMILTON will manage the newly organized California division of Welex, Inc., and **J. E. Stough** is assistant division manager, in Los Angeles. The California division includes districts in Bakersfield, Norwalk, and Ventura.

L. F. DRAKE has been named manager of the new Oklahoma division of Welex, Inc., with offices in Tulsa. The new division includes districts in Ardmore with **H. L. Humphrey** as manager; Bristow, with **M. F. Rothwell** in charge; Oklahoma City and Pauls Valley, with **B. D. Nation** as manager in Pauls Valley; Pawhuska, with **M. W. Power** as manager; Shawnee, with **R. L. Vanderslice** as manager; Stillwater, with **Charles Rotwell, Jr.** in charge; and Woodward, with **B. G. Taylor** as manager.

W. L. KILLEN has been elected executive vice-president of Downingtown Iron Works, Inc., a division of Pressed Steel Tank Co., Milwaukee. Formerly general manager of the Downingtown division, Killen joined the organization in 1925 as works manager.

GLEN CHANCE has been appointed representative for Drilco Oil Tools, Inc., of Midland, Tex., in the Ark-La-Tex district. He was formerly with Baash Ross Tool Co. and Republic Supply Co., and served for three years as sales and service representative with Lee C. Moore Co.

RUSKA INSTRUMENTS, Houston manufacturer and distributor of instruments for the oil industry, has been reorganized through a stock purchase by a group of Houston businessmen. New directors, who now own an interest in the company, include **J. Q. Weatherly,** attorney and former associate general counsel for Humble Oil & Refining Co.; **W. T. Campbell,** who has varied business interests in the Houston area; and **David Frame, Sr.,** and **David Frame, Jr.,** oil operators.

ROBERT L. HONEY has joined the Assn. of Oilwell Servicing Contractors as field representative and safety engineer, in Houston. Honey, formerly with Pan American Life Insurance Co., will assist the executive secretary in field operations of the association.

A. B. (Pete) PRICE, until recently with Anderson Seismograph Bit Service, has opened his own firm in Casper, Wyo., under the name of Old Faithful Bit Service.

ARTHUR D. MARKS has been named director of sales for Hercules Motors Corp., Canton, Ohio. He had been manager of the foreign division since 1945.

A. D. Marks

D. C. Kelley

DAVID C. KELLEY has been named sales and service representative for Cabot Shops, Inc., and Franks Division of Cabot, in Anaco, Venezuela. Kelley, a service engineer, has been servicing Franks equipment for the past 12 years.

W. O. SATTERWHITE has been named vice-president and manager of the newly organized West Texas division of Welex, Inc., in Midland. Welex districts under the new division include Abilene, Andrews, Crane, Brownfield, Monahans, Odessa, San Angelo, Snyder, all in Texas and Artesia, Hobbs, and Roswell, N. M.

CORNELIUS S. GOOCH has been named a service engineer for the Dallas office of B-I-F Industries, Inc., Providence, R. I. He most recently was a division manager of Lewis Dodson Engineering Co., Dallas, a B-I-F distributor.

COOK TESTING CO., Long Beach, Calif., has opened a new branch at Snyder, Tex., to provide formation testing and nitrogen service in the area. The company manufactures nitrogen in Odessa, Tex.

C. B. Nolte

W. S. Christian

CLAUDE B. NOLTE is the newly appointed vice-president in charge of product engineering and development, and **WILLIAM S. CHRISTIAN** the new sales manager, of Barton Instrument Corp., Monterey Park, Calif. Nolte, with the company since 1946, has served as vice-president, sales manager, and vice-president in charge of production. Christian was formerly assistant sales manager. **Everette M. Furr**, former production planning supervisor, moves up to factory superintendent.

IRWIN B. ALLEN has been appointed sales representative for Rector Well Equipment Co., Inc., in Caracas, Venezuela. Prior to joining Rector, he was with Helmerich & Payne.

RAYMOND E. ORTON has been appointed general manager of Cleveland Trencher Co., Cleveland. He formerly was manager of engineering in the automatic transportation division, Yale & Towne Mfg. Co., Chicago.

BERWIN L. PRICE, SHANNON L. MATHENY, JR., and **CHARLES W. HARRISON** have been appointed technical service representatives by Ideco, Inc., one of the Dresser Industries. Price transfers from the company's sales department in Dallas to Beaumont, where he will handle the Gulf Coast area. Matheny, formerly with Standard Vacuum in Indonesia and Continental Oil Co. in California, joins the California oilfield sales organization, in Long Beach. Harrison, who has been associated with Parkersburg Rig & Reel Co. and Ingalls Shipbuilding Corp., also will work the Gulf Coast area, from offices in Houston. **Willam E. Ridgeway** has joined the K. L. Bourdo oil field supply and service organization in Beirut, Lebanon, which represents Ideco products in the Middle East, Near East, and northcast Africa.

LEO H. HILLMAN has been appointed Tulsa field engineer for Reynolds Metal Co.'s newly created field service, designed specifically to work on aluminum applications in the oil industry. He was formerly with Dowell Inc. and The Refinery Engineering Co.

DR. JOHN N. PATTISON has been appointed director of research and development and **JOHN W. BENEDICT** is the new sales manager for Girdler catalysts in National Cylinder Gas Co.'s chemical products division, Louisville, Ky. Pattison was formerly head of the catalyst research section of Cities Service Research & Development Co., Lake Charles, La. Benedict has held various sales assignments with the petroleum catalyst department of Davison Chemical Co., a division of W. R. Grace & Co., for the past seven years.

ROY H. COSSEY and **C. E. (Moon) MULLINS** have been named district managers of two newly established field stations of Jetwell, Inc. Cossey will handle the central portion of Oklahoma from an office in Shawnee. Mullins will direct operations in eastern Kansas and northeastern Oklahoma from the firm's station at Winfield, Kan. A third station will be opened shortly in western Kansas, with **Jack P. Pouland**, of Wichita, as manager.

JACKSON S. CHAMPLIN, retired U.S. Navy rear admiral, has been appointed assistant to the director of Electrodynamics Corp.'s DataTape division, in Pasadena, Calif. **Russell P. Palmer**, assistant to the director of sales, succeeds Champlin as administrative manager of the division.

E. T. Landgraff

L. J. Smith

LOUIS J. SMITH has become vice-president and sales manager of Chiksan Co., and Chiksan of Canada, Ltd., and **EDWARD T. LANDGRAFF**, vice-president and sales manager of Chiksan Export Co. Replacing Smith as eastern regional sales manager, in Newark, N. J., is **John F. Powers, Jr.**, formerly senior field engineer. Landgraff, export sales manager since 1954, will continue to make Newark his headquarters. Smith will move to the company's main office and plant in Brea, Calif. These changes followed the resignation of **G. R. Winder** as vice-president and general sales manager of Chiksan and its two subsidiaries.

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The Industry Creates Price Wars

PRICE WAR SITUATIONS will continue to plague the industry until the people involved (and this includes suppliers, dealers, and consumers) realize that price wars benefit no one in the final analysis. Those are the words of R. E. Keresey, associate general counsel of Esso Standard Oil Co.

Price wars end, he told a group of New England businessmen last week, when the reasons that caused them no longer prevail.

The obvious deduction, then, is that if the reasons didn't exist in the first place, there would be no price wars.

What then causes price wars? Said the Esso spokesman: "Competition sometimes becomes so severe that ordinary businessmen lose their sense of perspective. Many times this results in what has commonly been described as price wars."

In reality, however, the "sense of perspective" is lost long before price wars start.

THE CAUSE OF PRICE WARS quite obviously is oversupply. An oversupply of any commodity causes its value to decline. But the oil industry is seemingly oblivious to both the causes and effects of cheap products. It has reached the point that the first sure signs that spring is approaching each year are the mounting inventories of gasoline—and quite frequently the outbreak of gasoline price wars in numerous sections of the country.

Just last week, for example, a Gulf Coast refiner reported that he is buying gasoline cheaper than he can make it. A Southwest Texas refiner had to make two cuts—totaling 80¢ a bbl.—in the price he pays for crude because his small plant was "losing $15,000 per month."

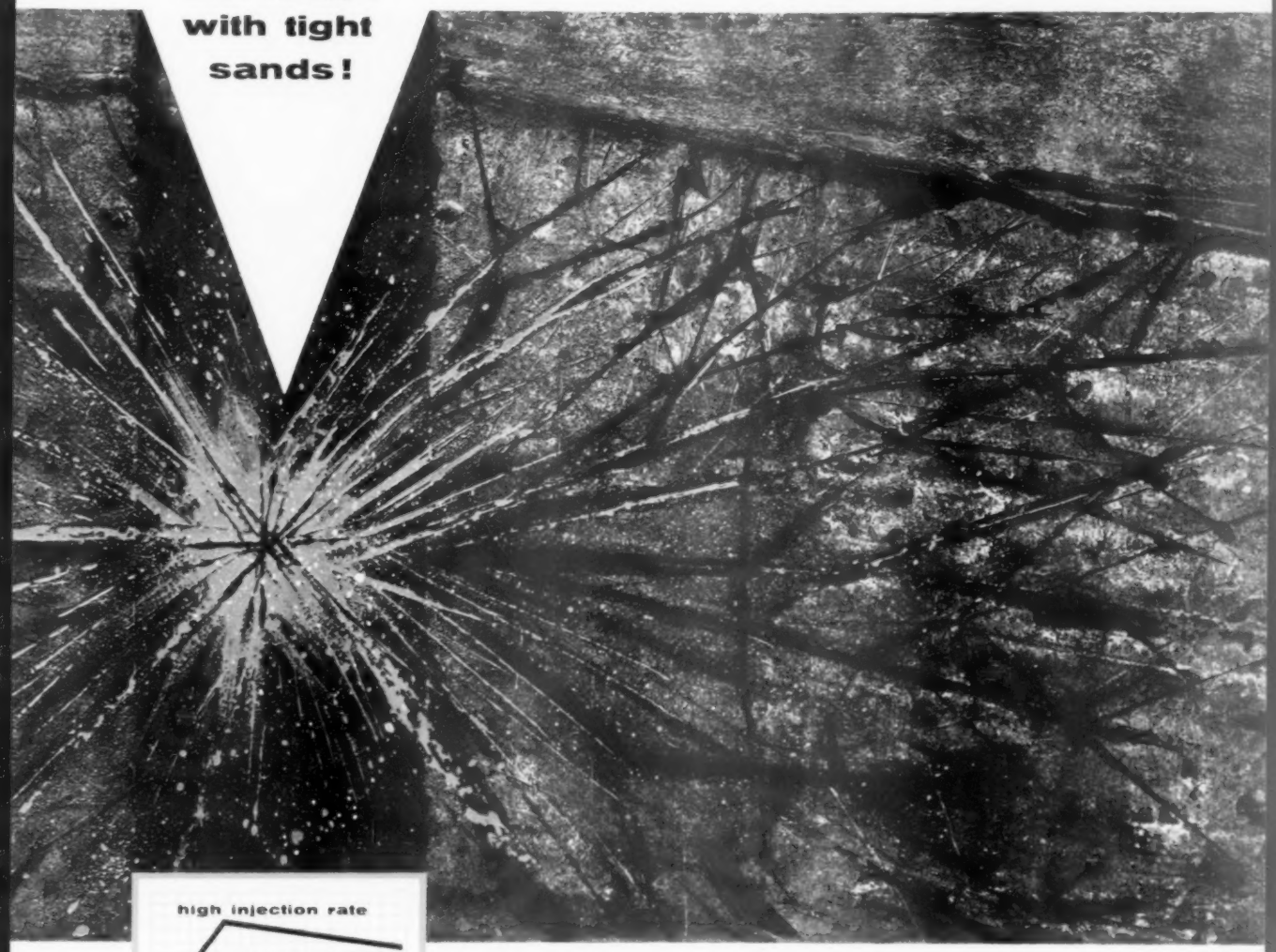
Producers selling crude to that refiner receive only $2.40 a bbl. for 40-gravity oil. Ten years ago, one producer reports, he was paid $3 a bbl. All oil men will agree that today's costs are substantially above the 1948 level.

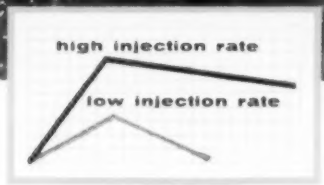
ONE SOLUTION TO PRICE WARS is for the industry to use its best know-how and business judgment to remain healthy and continue to increase its ability to serve its customers. The competitive urge that results in oversupply runs the risk of depleting the supply of a natural resource at a faster rate than capital can be generated to replenish that supply.

And should our greatest natural resource be depleted for lack of adequate capital funds, certainly the biggest losers will be the consumers of petroleum products.

The industry has an obligation to conserve petroleum resources to the maximum extent. Oversupply, and the resulting price wars, are opposed to all sound conservation principles.

Get tough with tight sands!





High injection rates have shown greater production and slower decline.

In most things, gentleness is good and proper.

But not so with some oil and gas reservoirs. To make them *give*, often calls for a "get tough" policy.

Dowell knows how to get tough with tight sands, and has the equipment needed to do it. Exclusive with Dowell is the new high-injection-rate "Frac Team": 1) the mighty Allison Pumper with power to spare, 2) the Remote Panel for safer operation, and 3) the Dowell Blender for precise control of sand and fluid mixing.

More and more, operators are finding that the harder you hit some formations with frac fluid, the greater the production is increased. Two to ten barrel-per-minute rates often provide little more than temporary stimulation. On the other hand, thirty to fifty bpm injection rates into the same formation often establish high and lasting production potentials. Also, with high injection rates, there is less danger of sand screen-outs.

Got a tight sand problem? Dowell will get after it with the experience and equipment they pioneered in high-injection-rate fracturing. Dowell Incorporated, Tulsa 1, Oklahoma.

Services for the oil industry

DOWELL

A Service Subsidiary of The Dow Chemical Company

News on Ethylene from England

Imperial Chemical Industries Ltd., the largest chemical manufacturing firm in the British Commonwealth, is meeting the increased demands for ethylene-derived products with a third ethylene manufacturing plant in northeast England. As the discoverer and a major producer of polyethylene, I.C.I. consumes large amounts of high purity ethylene.

The M. W. Kellogg organization was privileged to engineer I.C.I.'s first two ethylene plants. Kellogg is completing the engineering of the third plant, and has started construction. All three plants utilize the unique Kellogg steam-cracking process which produces exceptionally high yields of over 99% pure ethylene with a high on-stream efficiency.

The close cooperation and interchange of technology between I.C.I. and Kellogg will assure the success of this new plant as it did for the two now in operation. Kellogg's ability to work closely and harmoniously with chemical companies is largely responsible for the organization's leading international position in petrochemical engineering.

The M. W. Kellogg Company welcomes your petrochemical inquiries.

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